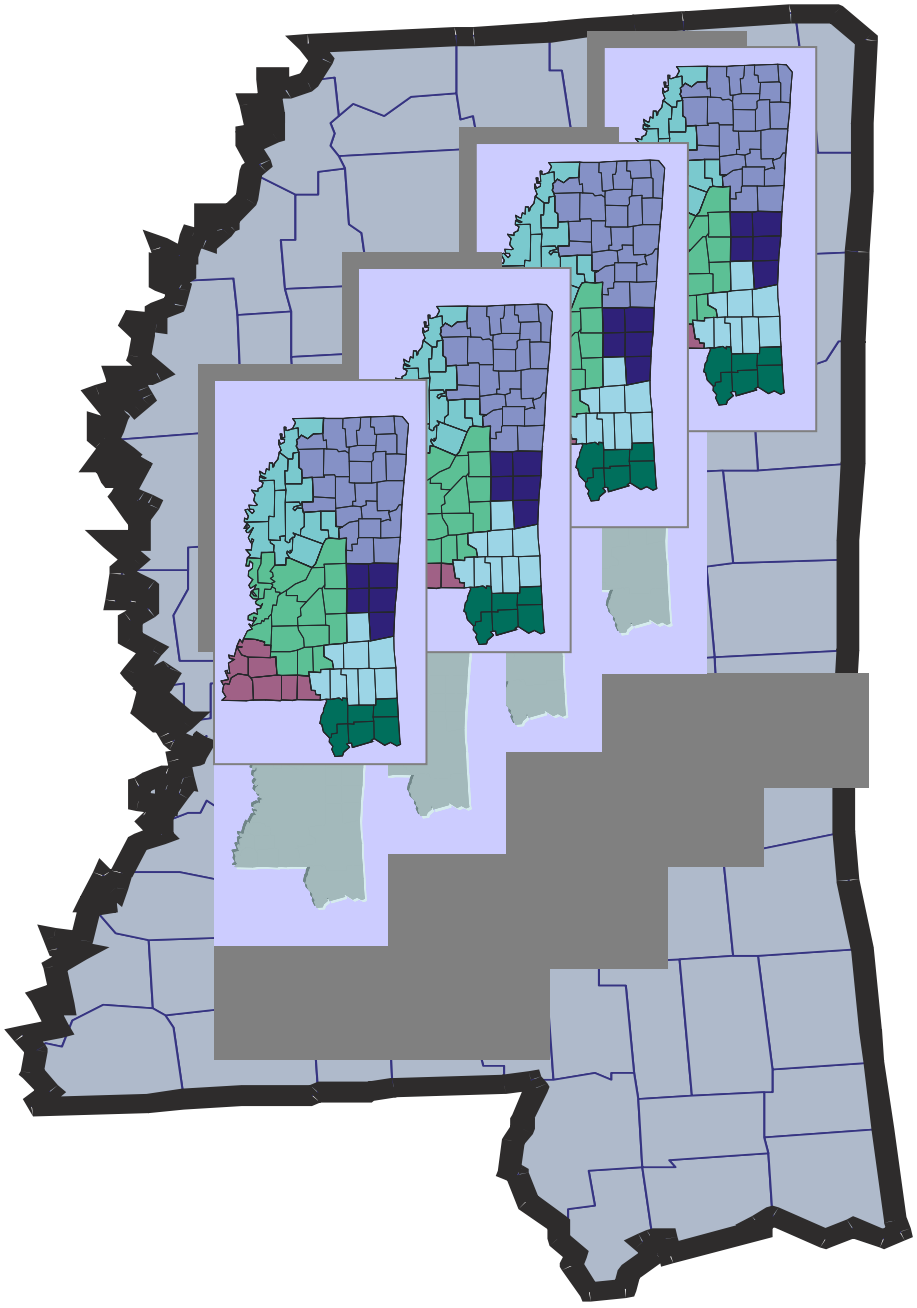
Mississippi State Health Plan
Review and Update



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Acknowledgements

This report examines selected components of the Mississippi State Health Plan. The examination, undertaken for the Mississippi State Department of Health, is responsive to the legislative requirements in Section 23 of House Bill 1696 (2007). Planning methods and standards are examined in the context of practices in peer states, national trends, and contemporary market conditions.

The American Health Planning Association (AHPA) appreciates the assistance of Mississippi State Department of Health Office of Health Policy and Planning staff, and those in other state planning programs, in providing data and information documenting contemporary planning methods and standards.

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Executive Summary

Mississippi's certificate of need (CON) program now covers about twenty health services. Regulation is based on a set of planning concepts and principles that, when converted into service specific planning criteria and standards, are used to manage the supply of regulated health care services and facilities. The planning principles, criteria, and standards commonly used are delineated in the Mississippi State Health Plan (MSHP). The plan also contains service and facility inventories and, in some cases, estimates of future service needs.

In 2006, the American Health Planning Association submitted in October 2006 an independent examination of the Mississippi CON program. The commissioned the study, titled *Health Services Planning and CON Regulation in Mississippi*, in response to and partial fulfillment of the requirements of Section 2 of H. B. 1221 (2006). The study found the MSHP compares favorably with most other state health plans. Notwithstanding the plan's strengths, the assessment identified several areas where changes might be made to facilitate better planning by providers of health services and to permit more equitable and effective CON regulation.

Assessing these and related components of the State Health Plan is necessary to respond directly to the requirements of Section 23 of H. B. 1696 (2007), which tasks the Mississippi State Department of Health with conducting a "review the State Health Plan using current technology and data".

Components identified for closer examination include:

- The underlying policy and the planning formulae used to determine the need for nursing home beds;
- The planning methodology used to project need for acute care hospital beds; and
- The planning methods and standards used to determine the need for advanced medical services, especially costly medical equipment incorporating technologies that are subject to rapid change.

Long-Term Nursing Care Services

Planning for long-term nursing care services has proven unusually difficult for the last two decades. Conflicting, and in some cases countervailing, demographic changes and shifts in long-term care delivery patterns continue to make projecting demand for long-term nursing care services problematic. Failure to plan effectively has led to the

imposition of moratoria on nursing home construction in a majority of states, including those with CON regulation of market entry and service capacity. Mississippi has maintained a moratorium on nursing home development for nearly two decades.

Aggregate demand for nursing home care in Mississippi has increased in both absolute and relative terms over the last three decades. Among neighboring and peer states, Mississippi has the second highest nursing home resident to elderly population ratio. Notwithstanding the comparatively high use levels, the nearly two decades long moratorium on development, and projected need for thousands of additional beds current licensed bed capacity and indigenous demand are reasonably in balance. This has occurred because policymakers have been judicious in granting exceptions to the moratorium and, perhaps more importantly, actual age-adjusted use rates have been decreasing consistently nationwide for nearly two decades. Consequently, regional and statewide nursing home use and occupancy levels remain at reasonable levels.

These fortuitous circumstances are not likely to continue indefinitely. Reliance on the moratorium to control supply, combined with a lack of data to plan effectively for nursing care services, has led to increasingly incongruous nursing home bed need projections. Recent editions of the State Health Plan suggest thousands of additional beds should be authorized, even though regional and statewide daily census and occupancy levels are not increasing significantly.

The MSHP formula used to project nursing home bed need is dated. The age-specific rates used are substantially higher than national rates and higher than those used in most peer states. Data are not now available to permit calculation of the actual age-specific use rates in Mississippi, but there is little reason to believe that they should be, or are, substantially higher than the average or median peer state experience.

Without age-specific Mississippi use data it is not possible to determine precisely what the Mississippi rate(s) should be and whether they should be applied statewide, by planning district, or at the county level. But without a significant reduction in the rates, the discontinuity between the State Health Plan bed need projection and day-to-day operational realities will grow.

Given these circumstances, the MIssissippi State Department of Health should conduct periodic statewide patient origin surveys of nursing facilities and patients to obtain the information required to document Mississippi nursing home use rates. Gathering and analyzing these data is the necessary first step in developing nursing home bed need projections in which policymakers can place confidence.

Conducting a statewide patient origin survey of all nursing facilities and patients also is the necessary first step toward lifting the moratorium on nursing home development. Once accurate data are available, and future bed need projected reliably, the rationale for maintaining the moratorium becomes less persuasive.

Rather than return to the open ended planning process that preceded imposition of the

current moratorium, the moratorium should be replaced with a planning process based on an annual call or request for applications. The request for applications (RFA) would control nursing home application submissions. Applications would be accepted only for areas (regions or counties) specified in the RFA. Once actual nursing home use rates are documented and realistic bed need projections are developed, replacing the moratorium with a stable, data-driven planning process would pose little risk of over development and unnecessary capital spending.

Recommendations: Long-Term Nursing Care Services

1. ***Data Collection:*** In consultation and collaboration with affected and interested parties, the Mississippi State Department of Health should conduct periodic statewide patient origin surveys of all licensed nursing facilities. These surveys should be conducted no less frequently than at five-year intervals. The initial survey should be undertaken as soon as possible, preferably in calendar year 2008. The facility and patient-level information collected should include the data elements recommended herein. Information describing a successful survey program is appended (Attachment 1, Appendix A).

2. ***Nursing Home Bed Need Formula:*** The formula used to project future nursing home bed need should be modified. It should be replaced with a formula that incorporates the age and gender specific use rates derived from the statewide patient origin survey. Language and need determination formulas incorporating survey derived nursing home use rates are appended (Attachments II-A and II-B, Appendix A).

    - If survey results warrant, consideration should be given to applying indigenous used rates differentially, e.g., by long-term care planning district, county, or other aggregations of counties.

    - In the event it is not possible to begin conducting statewide patient origin surveys within the next two years, the bed need formula should be modified to reflect the average or median use rate of peer states (e.g., North Carolina, South Carolina, Virginia) that base their rates on contemporaneous data collected statewide.

3. ***Nursing Home Moratorium:*** The moratorium on nursing home development should be lifted when the data collection program is in place and the formula used to project nursing home bed need has been normalized. It should be replaced with a planning process built around a request for applications (RFA) requirement**.** The planning process instituted should be modeled after the program that has been used with considerable success in Virginia for more than a decade. Principal features of the program should include**:**

    - An annual request for applications (RFA), issued by the Mississippi State Department of Health, delineating the number and region where additional nursing homes beds are required to meet projected public need. Projected bed

need determinations would be based on

  - Nursing home use rates derived from the most recent statewide survey,

  - Average regional (or county, if preferred) occupancy levels of 90% or greater over the preceding three years;
  - The pending availability of licensed beds previously authorized but not yet open; and
  - Compatibility of the projected bed need with state Medicaid program policy and budget considerations;

- Formal consultation with the Mississippi Medicaid program to determine the congruence of bed need projections with Medicaid budget requirements;
- A public comment period on any proposed request for applications to permit interested and affected parties to comment on the projected bed need determination before it becomes final with publication of the RFA; and
- A provision to permit interested parties to petition for publication of a request for applications to meet a special need that otherwise may not have been formally identified. Information describing the Virginia RFA program is appended (Appendix A).

Acute Care Hospital Capacity

Hospital use has changed markedly over the last three decades. After rising rapidly for several decades, demand for inpatient care decreased steadily nationwide between 1982 and 1997. In response to these changes, the hospital industry downsized throughout the period.

Demand rebounded somewhat during the last decade, but aggregate demand for inpatient services nationally is likely to grow modestly over the next decade. Demographic trends, technological changes, and evolving medical practice patterns indicate that substantial increases in inpatient demand nationally are not likely nationally until well after 2015.

A statewide glut of licensed acute care hospital beds complicates planning for community hospital services in Mississippi. The surplus did not result from the authorization of unnecessary hospitals or hospital beds. Most of the excess capacity was developed decades ago. The surplus results largely from the shift to outpatient care and from shorter inpatient stays of hospitalized patients.

Unlike most states, licensed acute care bed capacity in Mississippi did not decrease significantly over the last two decades. Though demand for and use of hospital services in Mississippi remains well above national and peer state levels, there is little prospect that the current bed surplus will be eliminated, or even noticeably reduced, by increased demand or other market forces. There is a distinct possibility that inpatient demand in Mississippi may decrease in many areas of the state over the next decade.

If planning for inpatient acute care services is to be rationalized, purposeful action will be necessary to reduce the surplus. The large statewide surpluses render the current bed need projection methodology largely ineffective or irrelevant. The method would work reasonably well where demand and capacity reasonably in balance, but has little utility when applied in areas (or at facilities) with large bed surpluses. Simply adjusting the formula would have little, if any, effect.

The current bed need projection methodology should be set aside. It should be replaced with a combined bed need projection and licensure formulation that would base the licensed bed capacity of each facility on the average inpatient census of the previous year (or the average of the previous three years). This method, combined with a policy change that would remove from the licensure rolls beds that have not been used for 12 months or more, offers the prospect of reducing systematically surplus capacity statewide. Models of variations of this methodology indicate that it can be implemented effectively and fairly.

A patient level data system is needed to permit population-based planning for inpatient acute care services when the large surpluses have been eliminated, or reduced substantially.

Recommendations: Acute Care Hospital Bed Capacity

1. ***Replace Hospital Bed Need Formula:*** The current acute care bed need should be replaced with a less complex and more flexible, dynamic formulation designed to reduce systematically excess capacity over a three to four year period. The most easily understood and applied formula would determine the number of beds that may be licensed for use during a specified licensure period, usually one year. The number of licensed beds permitted is a function of the average daily census reported for the previous licensure period, the previous calendar or fiscal year, inflated by an assigned operating efficiency factor. Statutory language describing a model program is attached (Appendix B).

2. ***Develop a Patient Level Acute Care Database***: Given Mississippi's distinct demography, relatively high acute care use rates that are likely to decrease over the next decade, and the need to reduce excess capacity as fairly and efficiently as possible, a patient level hospital discharge database should be established as soon as possible.

Medical Equipment and Technology

Mississippi regulates several medical services that entail investment in costly clinical technologies and equipment that change rapidly. The planning methodologies specified in the Mississippi State Health Plan for some of these services have not kept pace with technological and market changes. Some of the methods reflect the perspective, and appear to assume, that the service will be provided largely to hospital inpatients. The majority of the care provided now by these services is to ambulatory patients in

outpatient settings. Planning methods, criteria, and standards should be updated to reflect recent developments and trends, including the shift to outpatient focused care for many services.

Recommendations: Medical Equipment and Technology

1. ***Cardiovascular Services***: Planning criteria and standards for specialized cardiovascular services—therapeutic cardiac catheterization and open heart surgery—should be revised to reflect and coincide with the practices and standards recommended by professional organizations such as the American College of Cardiology and the American Heart Association..

   Current State Health Plan standards require that therapeutic cardiac catheterization be provided only in settings where there is on site open-heart surgery capability. Consistent with the policy of expanding access to advanced cardiovascular care statewide, consideration should be given to developing a demonstration project that would permit community hospitals meeting specified criteria to provide therapeutic cardiac catheterization without surgical backup.

   - ***Waiver Program***: Consideration should be given to establishing a formal PCI waiver/demonstration program tailored to the needs of Mississippi. More than a dozen states have formal therapeutic cardiac catheterization demonstration or exception projects that permit PCI procedures to be offered without on site cardiac surgery. Those programs should be examined to determine whether aspects of them could be appropriately applied in Mississippi. Information documenting an established waiver program has been submitted separately.

   - ***ACC/AHA Guidelines and Standards***: The Mississippi State Health Plan should be revised to indicate that, unless otherwise indicated, the professional planning guidelines and standards for open-heart surgery and cardiac catheterization recommended by the American College of Cardiology and the American Health Association will be followed in determining the need for open-heart surgery and cardiac catheterization services.

   - ***Data Collection***: The existing cardiovascular services data collection system should be improved. Data should be collected that would distinguish between inpatients and outpatients, by gender, type (procedure code), and zip code.

2. ***Interventional Radiology***: The current MSHP acknowledges the need to plan for digital subtraction angiography but provides only limited guidance. This guidance should be converted into a more detailed set of criteria and standards for the rapidly emerging field of interventional radiology. As with cardiac catheterization, the new review criteria and standards should acknowledge and reflect standards recommended by professional organizations.

- ***Planning Criteria and Standards***: Criteria and standards for determining need for interventional radiology services should be added to Mississippi State Health Plan. A proposed draft set of basic criteria and standards are appended (Appendix C).

- ***Data Collection***: Establish protocols for collecting needed interventional radiology resource and use data for both inpatients and outpatients by type (procedure code or other indicator) and zip code or other discrete geographic descriptor. These data are necessary to establish indigenous use rates and identify medical markets.

3. Radiation Therapy: Stereotactic radiosurgery (SRS) is the most recent advance in radiation therapy. It is distinctive in that it entails the use of a high-intensity, precisely focused energy beam to deliver a high dose of radiation designed to destroy tumors and other lesions with one exposure (treatment), or in some cases between two and five treatment fractions.

The emergence of stereotactic radiosurgery (SRS) technology in not considered in the plan. The Plan does contain standards for Gamma Knife® development and use. This is the only form of SRS technology referenced. The plan does not address SRS in the form of Cyber Knife® systems or other linear accelerator based SRS systems.

- ***Data Collection:*** Establish protocols for identifying existing SRS capable radiation therapy systems and monitoring future SRS resources and service volumes.

- ***Data Analysis:*** Conduct analysis of discrete radiation therapy use to determine intrastate variation (variation by planning district) in the percentage of diagnosed cancer patients that receive radiation therapy and in the numbers of treatments provided.

- ***Planning Policy***: Planning policies governing radiation therapy services should be revised to indicate that

    - The introduction and diffusion of SRS technology will be controlled by favoring the replacement of obsolete conventional linear accelerators with multifunctional linear accelerators incorporating SRS capability;
    - For regional planning purposes, a Cyber Knife® will be considered a multifunctional linear accelerator; and
    - Should results of the data analysis warrant, the formula used to project need for radiation therapy services should be revised to reflect the actual percentage of diagnosed patients referred for radiation therapy and the actual number of treatments provided.

4. ***Diagnostic Imaging Services:*** The 2006 AHPA assessment of the Mississippi certificate of need program, *Health Services Planning and CON Regulation in Mississippi*, contained several recommendations for changes in the planning and regulation of diagnostic imaging services. The planning environment and regulatory circumstances affecting diagnostic imaging services described in that report have not changed significantly. Reexamination of the planning processes and standards used for these services greater depth leads to the following recommendations.

   - **Magnetic Resonance Imaging (MRI) Services Recommendations**

     - ***Minimum Service Volume***: Given the technological advances in MRI scanning, and the doubling of effective MRI capacity and throughput over the last decade, the minimum service volume planning standard should be increased from 1,700 scans to 3,500 scans per year for mobile services and fixed site services in rural areas. Consideration should be given to raising the minimum volume for urban fixed site services to 4,500 scans per year.

     - ***Need Determination Formula***: The current need determination formula appears to be dated. It should be replaced with a population based formula based on historical and projected use rates by planning district and by service area where patient origin data are available to permit service area identification and analysis.

   - ***Positron Emission Tomography (PET) Services Recommendations***

     - ***Minimum Service Volume***: Given the technological advances in PET-CT scanning, the capacity and throughput of PET-CT scanners, the limited demand for PET services, and the small number of procedures per patient over a course of radiation therapy, the minimum service volume planning standard should be increased from 750 scans to 1,500 scans per scanner per year. The service area population considered necessary to support a PET-CT service should be increased to 500,000 persons.

   - ***Computed Tomography (CT) Services Recommendation***

     - ***Regulation of CT Services*:** Establishment and expansion of CT scanning services should be subject to CON regulation. Coverage should be modeled after that applied to MRI services. Replacement of existing CT scanners should remain exempt from CON review.

   - ***Conversion of Mobile Services to Fixed Services:*** The practice of permitting existing mobile service sites to convert to fixed service sites outside of CON review is problematic. It generates considerable uncertainty and instability,

making effective planning for affected services, especially MRI services and equipment, unusually difficult. It also raises fairness and equity considerations. For planning and regulatory services, conversion of a mobile service to a fixed site service should be considered to be the establishment of a new service requiring review and CON approval.

- ***Medical Equipment Capital Expenditure Review Threshold:*** The Mississippi medical equipment capital expenditure review threshold is higher than that of most states. This, and the permutations associated with the implementation of the threshold, creates disincentives for efficient and effective program operations. The medical equipment capital expenditure review threshold should be eliminated and all new services and all expansions (equipment additions) of covered services and medical equipment should be subject to CON review. This change should be accompanied with the exemption of all equipment replacement projects from review.

General Recommendations

1. ***Data Collection and Analysis***: The 2006 AHPA assessment of the Mississippi certificate of need program, *Health Services Planning and CON Regulation in Mississippi*, contained the recommendation that a patient-level data system be developed to promote more effective planning and more equitable regulation. The planning environment and regulatory circumstances leading to that recommendation have not changed. The recommendation from that assessment is restated without elaboration.

    - ***Patient-Level Health Data System:*** Mississippi and Idaho are the only states that do not have, or are not developing, a statewide patient-level hospital discharge database. There are many indications of the need for such data. Comprehensive patient level data are needed to permit the better informed and more precise planning that is required to improve CON regulation, particularly in ensuring fairness and equity among service providers. Consideration should be given to working with the Mississippi Hospital Association to establish a comprehensive all payer patient-level hospital discharge data system.

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I
Introduction

A. Purpose

The Mississippi State Department of Health (MSDH) commissioned this examination of selected aspects of the Mississippi State Health Plan in response to Section 23 of HB 1696 (2007). The study calls for a review of the acute care hospital bed, nursing home bed, and advanced technology components of the plan. The 2006 American Health Planning Association assessment of the Mississippi certificate of need program, titled *Health Services Planning and CON Regulation in Mississippi*, found that these components of the State Health Plan could benefit from more intensive examination and updating.

The underlying purpose is to ensure that the planning and analysis undertaken in support of CON regulation is practical and effective. The assessment is to ensure that the planning methods used reflect changing demographic and medical trade patterns, technological advances, and incorporate methods and practices found to be useful elsewhere.

B. Data

Data and information used in this report comes largely from state health planning and CON programs nationwide, principally from states adjoining Mississippi and those with planning and CON programs of comparable duration and scope. Sources include:

- CON program information collected from selected state programs;
- Planning documents and CON review criteria and standards for Mississippi and comparable (peer) states;
- Mississippi health facility resource and use data for the period 2001 through 2006;
- Hospital patient origin data for Mississippi and neighboring states; and
- Health facility and service resource and use data from states adjoining and/or with CON and planning programs similar to those of Mississippi.

These data permit examination of Mississippi planning methods and standards in the context of the methods, standards and results in states with comparable programs and practices. The principal obstacle encountered is the lack of patient level and geographic specific health service data in Mississippi.

C. Environment and Trends

The environment and the trends in planning and certificate of need (CON) regulation described in the October 2006 report have not changed significantly in the last decade. Though there have been minor changes in planning and CON statutes in some states, neither the scope nor the intensity of regulation have changed appreciably. Thirty-six states and the District of Columbia continue to maintain CON programs.

CON regulation, and the planning that supports it, remain a matter of considerable debate. Controversy and debate notwithstanding, there is no evident general trend toward deregulation. There appears to be as much activity directed toward expanding the scope of regulation, and in some cases to reinstate discontinued CON programs, as toward the reduction or elimination of regulation.[1] Concerns about access to care among the medically indigent, the economic stability and viability of essential community hospitals, and the perceived need to control state health care spending, especially Medicaid program spending for nursing homes, remain the foundation of support for CON programs in most states.

II

Long Term Nursing Care Services

A. Context

Planning for long-term nursing services, arguably less complex than planning for acute care services, has proven unusually difficult nevertheless. The difficulty is in part technical. Unlike with acute care hospital services, few states maintain data systems that provide the information required to identify and monitor service trends and to project reliably future bed need. Similarly, there is not adequate data to permit the effects of consumer use home health care services, personal care homes, day care services, and other alternatives to nursing home services to be incorporated, or otherwise accurately reflected, in long-term nursing care services planning. Because of this, planning and service evaluation, including the discussion presented here, usually necessarily focuses on skilled nursing care facilities and their use.

Difficulties arise also from the elastic nature of demand for long-term nursing care services and from the disproportionate reliance on public payment for most forms of long-term care, especially routine nursing home care. Perhaps even more problematic, effective planning for institutional long-term care services during the last two decades has required counterintuitive thinking and action. Although the population most at risk of requiring nursing home care has grown significantly for many years, use of nursing home services continues to decrease.

This pattern of an "aging population" and decreasing nursing home use rates, though not inherently incompatible or difficult to understand, has proven unusually difficult to incorporate in operational planning. Most nursing home bed planning methodologies are based on static bed need formulas. Often this may be the case because the data required for more robust analysis are not available. But even where the data are available, planners tend to favor static formulae over a more dynamic, and usually a more accurate, trend analysis. This is particularly the case where the analyses and methods project decreasing demand. Negative trends lines are far more problematic—less acceptable to a wide array of interested and affected parties—than are positive trend lines. This has contributed to the accumulation of large nursing home bed surpluses in many states.

These circumstances, and associated difficulties, have led to a common paradox: states with CON regulation imposing moratoria on nursing home development. With use rates falling, aggregate demand stable or decreasing, and planning methodologies projecting need for substantial numbers of additional beds, policymakers necessarily opt for the only

consensus policy tool available—a moratorium on development. Over the last two decades, a substantial majority of states, with and without CON regulation, have placed a moratorium on the development of nursing home beds. Most were intended to be short-term, a temporary policy fix until an acceptable planning solution could be found. Many of these moratoria lasted for more than a decade. Some continue today.

Although most moratoria have been imposed to control state Medicaid program spending on nursing home care, that policymakers found them necessary certifies the failure of planning and regulation to resolve the underlying questions. Though necessary in some cases, legislative moratoria are inherently cumbersome tools. In most cases, they give temporary relief but raise new sets of problems.

Mississippi has one of the nation's most enduring moratoria on nursing home development. It complicates planning for nursing homes. Recent state health plans have routinely shown a need for thousands of additional nursing homes beds. Ostensibly, the moratorium prevents the development of these beds. The 2006 AHPA report suggested that the moratorium be replaced "with a restructured prospective planning process" that would incorporate a "request for applications" provision to manage capacity. That question and related considerations are discussed below.

B. National Patterns and Trends

More than 12% of the U. S. population is elderly, 65 years of age and older, with more than 1.5% 85 years of age and older. A small, but significant, percentage of the elderly require long term nursing care at some point. The overall (lifetime) risk of requiring nursing home care after the age of 65 years has been estimated to be more than 40%.[2] The risk is highest among those over 75 years of age. Over the last decade, between 4% and 5% of the elderly population has required nursing home care annually. There are now nearly 2.0 million nursing home residents nationwide.

Although the elderly population has grown more rapidly than most other age groups in recent years, demand for nursing home care has been falling steadily nationwide, as well as in most states and communities. The rate of population growth among those age 65 years and older is likely to moderate over the next decade, before accelerating again in during the following two decades. The moderating growth in the elderly population, the substitution of alternative forms of care for institutional nursing home services, and shorter lengths of nursing home stays are likely to result in decreased nursing home use rates in the near term. It is unclear how long nursing home use rate decreases will offset increased demand resulting from population growth and aging. Aggregate increases in demand, if any, are likely to be modest, and there is a strong possibility of continued decreases in aggregate demand over the next decade. The reduction could be substantial in many communities.

Over the longer term, nursing home demand could grow substantially, especially when the baby boom age cohort begins to reach 75 years of age (2021), and as the use of the principal alternatives to nursing home care, such as home health care and assisted living

arrangements, is maximized. By 2030 there may be more than 60 million people over 65 years of age in the U.S, with between 3.0 and 4.0 million people requiring nursing home care annually.

Some longer-range projections suggest that by 2050 nearly 20% of the population, about 80 million persons, will be 65 years of age and older. The percentage of elderly requiring inpatient long-term nursing care is projected to stabilize at between 5% and 6% of those over age 65 years, with demand concentrated among those 75 years of age and older.[3] This could result in aggregate demand being 50% to 60% higher than currently. These projections assume current and recent age-specific use norms. Given the sustained downward trend in many regions, however, expressed demand decades hence may be significantly lower than projected.

Current long term nursing care use and operations are best understood in the context of the evolution of the service over the last three decades. Aggregate demand for nursing home services grew steadily for nearly three decades. The number of patients in certified facilities increased from about 1.1 million in 1971 to about 1.6 million in 1990, an increase of about 27%. Aggregate demand peaked at about 1.8 million patients in 1997 and began to decrease shortly thereafter. Use of certified facilities fell by nearly 20% over the last nine years, from about 1.8 in 1997 to about 1.4 million patients in 2006.[4]

Table 1
Nursing Home Capacity and Use
Certified Nursing Home Beds
U.S., 1978 - 2006

Nursing Capacity	Year					Percent Change			
	1978	1986	2000	2004	2006	1978 - 2000	1978 - 2006	2000 - 2004	2000 - 2006
Facilities	14,244	15,304	17,023	16,090	15,861	19.5%	11.4%	-5.5%	-6.8%
Beds	1,313,019	1,529,226	1,843,422	1,765,730	1,673,085	40.4%	27.4%	-4.2%	-9.2%
Average # Beds	92	100	109	110	106	18.5%	15.2%	0.9%	-2.8%

Source: NCHS, Health United States, 1993-2006; AHCA, CMS, OSCAR Survey Data, 2006.

Capacity changes mirrored, and in some cases lagged, demand. Following rapid expansion in the 1960s and early 1970s, the number of certified nursing homes grew slowly but steadily over the two decades between 1978 and 1997. The 14,244 certified facilities reported in 1978 increased to 15,304 (7.3%) in 1986, and further to 17,023 (another 11.2%) in 2000. Aggregate nursing home demand peaked nationally in 1997. Decreasing demand resulted in a reduction in the number of facilities operated, a decrease to 15,861 (6.8%) by 2006 (Table 1). The number of licensed beds, and hence overall capacity, grew more rapidly than the number of facilities between 1978 and 2000. Certified facilities reported operating 1,313,019 beds in 1978, 1,529,226 beds in 1986 (an increase of 16.5%), and 1,843,259 beds in 2000 (an additional increase of 21.0%). Between 2000 and 2006, the licensed bed complement decreased by 9.2%, to 1,673,085 beds (Table 1).

The difference between the facility and the licensed bed rates of growth reflects a substantial increase in the average size of facilities operated. The average number of beds operated increased from 92 in 1978, to 109 in 2000 (Table 1). These changes reflect larger scales of operation and suggest improved operating efficiency and service capability generally. They occurred concomitantly with the formation of a number of large national nursing home chains, which grew by developing new services and acquiring existing facilities. With the capacity reductions since 2000, the average facility size decreased to 106 beds in 2006.

Table 2
Nursing Home Use Rates
United States, 1974 - 2004
Residents per 1,000 Population
By Age, Gender, Race

Nursing Facility Resident Demography	Year						Percent Change			
	1974	*1985*	*1995*	*1997*	*1999*	*2004*	*1974-2004*	*1985-2004*	*1997-2004*	*1999-2004*
Age										
Under 65 Years	0.9	0.8	0.5	0.6	0.7	0.7	-22.2%	-12.5%	-33.3%	0.0%
65 Years and Older	58.5	54.0	46.4	45.4	43.3	34.8	-40.5%	-35.6%	-22.4%	-19.6%
65 - 74 Years of Age	12.3	12.5	10.2	10.8	10.8	9.4	-23.6%	-24.8%	-12.2%	-13.0%
75 - 84 Years of Age	57.7	57.7	46.1	45.5	43.0	36.1	-37.4%	-37.4%	-21.1%	-16.0%
85 Years and Older	257.3	220.3	200.9	192.0	182.5	138.7	-46.1%	-37.0%	-25.4%	-24.0%
Gender and Age: Male										
65 Years and Older	42.5	38.8	33.0	32.0	30.6	24.1	-43.3%	-37.9%	-24.7%	-21.2%
65 - 74 Years of Age	11.3	10.8	9.6	9.8	10.3	8.9	-21.2%	-17.6%	-13.3%	-13.6%
75 - 84 Years of Age	39.9	43.0	33.5	34.6	30.8	27.0	-32.3%	-37.2%	-13.3%	-12.3%
85 Years and Older	182.7	145.7	131.5	119.0	116.5	80.0	-56.2%	-45.1%	-34.9%	-31.3%
Gender and Age: Female										
65 Years and Older	67.5	61.5	52.8	52.0	49.8	40.4	-40.1%	-34.3%	-23.0%	-18.9%
65 - 74 Years of Age	13.1	13.8	10.7	11.6	11.2	9.8	-25.2%	-29.0%	-11.5%	-12.5%
75 - 84 Years of Age	68.9	66.4	54.3	52.7	51.2	42.3	-38.6%	-36.3%	-23.5%	-17.4%
85 Years and Older	294.9	250.1	228.1	221.6	210.5	165.2	-44.0%	-33.9%	-24.9%	-21.5%
Race and Age: White										
65 Years and Older	61.2	55.5	45.8	44.5	41.9	34.0	-44.4%	-38.7%	-27.3%	-18.9%
65 - 74 Years of Age	12.5	12.3	9.3	10.0	10.0	8.5	-32.0%	-30.9%	-20.0%	-15.0%
75 - 84 Years of Age	60.3	59.1	45.0	44.2	40.5	35.2	-41.6%	-40.4%	-26.7%	-13.1%
85 Years and Older	270.8	228.7	203.2	192.4	181.8	139.4	-48.5%	-39.0%	-29.0%	-23.3%
Race and Age: Black										
65 Years and Older	28.2	41.5	50.8	54.4	55.5	49.9	77.0%	20.2%	92.9%	-10.1%
65 - 74 Years of Age	11.1	15.4	18.5	19.2	18.2	20.2	82.0%	31.2%	73.0%	11.0%
75 - 84 Years of Age	26.7	45.3	57.8	60.6	66.5	55.5	107.9%	22.5%	127.0%	-16.5%
85 Years and Older	105.7	141.5	168.2	186.0	182.8	160.7	52.0%	13.6%	76.0%	-12.1%

SOURCE: Centers for Disease Control and Prevention, NCHS, National Nursing Home Survey. Health, United States 2006

Although aggregate demand for nursing home care did not begin to decrease until the late 1990s, *use rates* have been decreasing gradually but consistently for more than two decades (Table 2). The changes have been substantial. Between 1974 and 2004, for example, there was a more than 20% decrease in age specific use rates for all older age groups, those 65 years of age and older. It is notable that the largest decrease has been among the oldest age group, those 85 years of age and older. It is also noteworthy that the majority of the reduction has occurred during the last decade, with the rate of change increasing modestly since 1995. The trend is still underway.

Use rate changes have varied considerably by gender and race. Generally, decreases have been greater among white males. Rates remain higher for females than males of all ages. With the decreases among white males, the gender use rate disparity grew over the last three decades.

In contrast to Whites, rates for Blacks increased among most age groups during the period. In 1974, nursing home use rates among Blacks were substantially below those of Whites. By 1999, age-specific rates for Blacks were generally consistent with those of Whites. Rates for Blacks are now notably higher than those of Whites. The changes appear to reflect normalization of access to nursing home care for minority populations.

Characteristics of patients requiring nursing home care also have changed noticeably. In general, nursing home patients in the 1990s were older, more debilitated, more likely than patients a decade earlier to be Medicare patients, and more likely to have been admitted from hospitals rather than from home or from another nursing home. Between 1987 and 1996, the average age of elderly nursing home patients (those 65 years of age and older) rose from 83.5 to 84.6 years. The average age of nursing home residents less than 65 years of age also increased, rising from 49.3 to 50.8 years. During this period, the proportion of nursing home patients over 84 years of age increased from 49% to 56% among women, and from 29% to 33% among men.[5] Thus, the average age of all categories of nursing home patients increased substantially over the decade. Information from states with data systems that permit longitudinal tracking of nursing home residents indicates that this trend continues at a steady pace. Postponed and delayed admissions to nursing homes explains part of the persistent use rate decline.[6]

Consistent with an older patient population, the level of disability and debility among nursing home patients continues to increase. In 1987, about 72% of nursing home residents in certified facilities required assistance with three or more activities of daily living (ADLs). In 1996, nearly 83% required such assistance, a 16% increase over the decade. Consistent with higher mean age levels and higher disability and acuity levels, a higher percentage of patients were admitted directly from hospitals in 1996 than a decade earlier. Average stays have decreased somewhat. Average stays in freestanding facilities are now less than one year.

Another notable change in recent years is the increased need for skilled nursing services and the emergence of specialty care units (e.g., Alzheimer's and dementia units, rehabilitation units and sub-acute units) to serve selected patients. There were few such specialty units in 1987. By 1996, about one nursing home in five had at least one specialty unit, and about 7% of licensed beds were located in these units.[7]

There is a substantial body of research on the development, operations and role of nursing homes in the health care system. Some of these studies have investigated attempts to control, and otherwise manage, nursing home capacity at the state level. One such study found the number of years a state had a CON program, or imposed a moratorium on nursing home beds, to be negatively correlated with both the percentage of nursing home bed growth and the ratio of beds per 1,000 persons 85 years of age and

older in the state. The same study reported a positive correlation between occupancy levels and the number of years a state had CON regulation or a moratorium.[8] Others found evidence that low Medicaid payment rates, too, are effective in reducing and otherwise controlling nursing home capacity, and that variation in payment levels likely explains some of the variation in capacity among states.[9]

Bedney, Harrington and others examined the demand for long-term nursing care services and trends in nursing home development between 1978 and 1993. The investigators reached a number of conclusions worthy of note, particularly the finding that the two factors affecting the supply of nursing home beds most were state CON programs and state Medicaid reimbursement policies.[10] They did not establish the relative contributions of each factor to the supply patterns and changes observed.

Examination of facility and bed growth rates, occupancy levels, bed-to-population ratios and the expressed opinion of state officials revealed wide variations regionally and among states, but no clear indication of appropriate or optimal nursing home capacity levels or goals. The results showed that**,** nationally**,** the ratio of nursing home beds per 1,000 persons age 65 years of age and older remained roughly stable at about 53, whereas the ratio of beds per 1,000 persons 85 years of age and older decreased substantially, from about 610 beds per 1,000 in 1978 to about 490 per 1,000 in 1993.[11] The investigators speculated that the decrease may reflect, or be evidence of, bed ratios in high capacity (or over capacity) states regressing to the national mean, given that nearly all states with above-average ratios decreased during the period.[12]

As with some other researchers, the investigators found significant inverse correlations between bed-to-population ratios and average occupancy. They also found significant positive correlation between the combined effects of bed-to-population ratios and occupancy levels and the expressed opinions that the nursing home bed supply was adequate.[13]

Shifts in source of payment for nursing home care have been fairly uniform nationally over the last decade and a half. The percentage of patients that rely on Medicare program payments nearly doubled between 1991 and 1998 increasing from 4.7% to 8.7% The increase in the percentage of patients who rely on Medicare payments was accompanied by a reduction in the percentage of private pay patients. Thus, the percentage of patients relying on public payments increased significantly. This trend is continuing.

C. Mississippi Experience

Demand for nursing home care in Mississippi has increased in both absolute and relative terms over the last three decades. In 1978, for example, there were 471 nursing home residents for each 1,000 persons 85 years of age or older in Mississippi, about 24% fewer than the national ratio of 621 residents for each 1,000 persons 85 and older. Eight years later, the national ratio had fallen to 539 residents per 1,000 and the Mississippi ratio had increased modestly to 475 residents per 1,000 persons 85 years and older (Table 3). Nearly a decade later (1995) the Mississippi and national ratios converged at about 405

residents per 1,000 persons 85 years and older. Over the last decade, 1996 through 2004, the national ratio has continued to decrease steadily. The Mississippi ratio too decreased modestly through 2002, before increasing in 2003 and 2004. In creases in 2003 and 2004 probably reflects the opening of additional beds authorized in 1999 and the anomalous decrease in the population 85 years of age and older (Table3, Table 4).

Table 3
Nursing Home Use Rate Trend
Mississippi and Peer States, 1978 - 2004
Nursing Home Residents per 1,000 Population 85+ Years

Jurisdiction	Year											
	1978	*1986*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
United States	621	539	405	393	388	374	358	349	330	318	308	297
Mississippi	***471***	***475***	***405***	***395***	***403***	***395***	***390***	***369***	***357***	***356***	***367***	***407***
Alabama.	598	488	370	370	371	363	359	343	337	332	330	355
Arkansas	753	689	508	499	484	462	444	416	389	371	366	371
Florida.	338	306	228	218	222	222	214	208	201	196	194	192
Georgia.	830	666	496	474	463	442	425	416	393	380	375	377
Kentucky	484	471	392	401	402	401	398	390	379	371	371	381
Louisiana.	696	741	639	616	582	551	551	524	499	484	470	474
Maryland	636	554	433	408	424	406	372	383	358	348	326	305
North Carolina.	423	383	401	400	393	367	350	348	333	323	320	314
South Carolina.	533	450	366	357	349	340	331	313	303	292	278	275
Tennessee.	480	554	480	474	469	459	450	426	408	392	384	397
Virginia	421	411	385	363	348	341	323	310	291	284	278	273
West Virginia	285	362	355	349	344	333	316	325	315	305	298	303

Source: CDC, NCHS, National Nursing Home Survey. Health, United States 2006

The data that reveal these patterns are National Center for Health Statistics (NCHS) survey data of nursing homes with beds certified for use by Medicare and Medicaid program patients. These data permit comparison use levels, patterns, and trends among peer states. They show that among neighboring and peer states, Mississippi has the second highest nursing home resident to elderly population ratio. Only the Louisiana rate is significantly higher. The Mississippi ratio is roughly comparable with the ratios of neighboring states (Alabama, Arkansas, Louisiana, Tennessee) but more than 20% higher than those of most other peer states (Table 3).

Data for all licensed beds, Medicare/Medicaid certified and uncertified beds, reveals a similar pattern. Absolute demand increased by about 8% between 1999 and 2004. This increase reflected a significant increase in use rates, as the population 65 years of age and older grew by only 3.1% during the five-year period and the population 85 years of age and older actually decreased by more than 6% (Table 4). These data support the conclusion that relative demand for nursing home care in Mississippi is comparatively high. Unlike most peer states, both absolute demand and use rates have increased modestly since demand peaked nationally in the late 1990s.

In principle, expressed demand for nursing home services could be depressed by the moratorium on nursing home development that has been in place for nearly two decades. This impression is reinforced by bed need projections published each year in the State Health Plan (SHP). In each of the last two editions (2006 –2007), the plan has shown a need for more than 8,000 additional beds. If acted upon, this projection would result in a net increase in capacity of more than 45%.

Notwithstanding the comparatively high use levels, the nearly two decades long moratorium on development, and projected need for thousands of additional beds, there is considerable reason to believe that current capacity and demand are reasonably in balance. Evidence of this includes stable average occupancy levels over the last five years. Average annual occupancy statewide has ranged between 87.5% and 89.1% between 2001 and 2005. Throughout this period occupancy was relatively stable across long-term care planning districts (LTCPD). The range was generally between 85% and 90%. Only LTCPD 2 has average annual occupancy of more than 90% in more than one year during the period. The highest occupancy level was 94.1% in LTCPD 2 in 2001. Although demand increased significantly in the district between 2001 and 2005, with the addition of nearly 400 beds, average occupancy in the district decreased gradually, falling to 89.2% in 2005.

Table 4
Mississippi Nursing Home Capacity and Use
1999 - 2004*

Population Group, Residents, Beds	1999	2000	2001	2002	2003	2004	% Change 1999 - 2004
Population							
Population, 65+ Years	342,335	344,028	345,330	347,010	349,938	352,867	3.1%
Population, 85+ Years	42,266	42,795	41,807	41,086	40,402	39,632	-6.2%
Nursing Home Residents							
Nursing Home Residents	28,003	28,384	29,131	29,465	29,803	30,247	8.0%
Residents per 1,000 Population 65+ Years	82	83	84	85	85	86	4.8%
Residents per 1,000 Population 85+ Years	663	663	697	717	738	763	15.2%
Licensed Beds, All Certification Status							
Licensed Beds	17,631	18,161	18,566	18,896	18,964	19,099	8.3%
Beds per 1,000 Population 65+ Years	51.5	52.8	53.8	54.5	54.2	54.1	5.1%
Beds per 1,000 Population 85+ Years	417.1	424.4	444.1	459.9	469.4	481.9	15.5%

Source: Mississippi State Department of Health, 2007; U. S. Census Bureau, 2006.

*Data necessary for calculation of 2005 and 2006 rates not available.

There is good reason to believe that the formula used to project nursing home bed need is dated. The age-specific rates used in the formula are substantially higher than those used in most peer states (Table 5). They are also substantially higher than the national age-specific use rates (Table 6). Data are not available to permit calculation of the actual age-specific use rates in Mississippi, but there is little reason to believe that they should be, or are, substantially higher than the average or median of peer state experience.

Population age and gender are the two best demographic predictors of nursing home service demand. The age profile of the Mississippi population is not significantly dissimilar from that of the national population or of the age distribution of the populations among peer states. The differences between the age-specific use rates used in Mississippi and those used in most peer states are substantially greater than the demographic differentials would suggest.

Most states use a variation of one of two basic formulas to project need for nursing homes beds. Some use a single nursing home bed to elderly population ratio factor, usually expressed as the number of beds thought to be needed to serve 1,000 persons 65 years of age and older. Others try to be more precise by incorporating consideration of the wide differences in demand for nursing home care that are associated with service population age. These states use age-group specific bed to population ratios for four or more age groups. They typically apply different bed to population ratios to the age groups used, with the ratios increasing sharply in the higher age ranges (Table 5).

Table 5
Comparative Nursing Home Use Rate Assumptions
Beds Required per 1,000 Persons
Mississippi and Peer States

State	Age Group			
	0 - 64 Years	*65 - 74 Years*	*75 - 84 Years*	*85+ Years*
United States	***0.7***	***9.4***	***36.1***	***138.7***
Mississippi	0.5	14.0	58.0	179.0
Tennessee	0.5	12.0	60.0	150.0
Georgia	0.4	9.8	32.5	120.0
Virginia	0.4	8.3	32.7	131.7
North Carolina	0.6	9.9	35.5	114.1

Source: State Health Plans; State Medical Facilities Plans; State Planning Guidelines, 2007.

With up-to-date reliable data, either method could be used effectively. Nevertheless, given the wide intrastate variation in demand for nursing home services seen in most states, the age-group specific method is of considerably greater utility in planning for services at the regional and local levels. The key question, regardless of the method used, is whether reliable up-to-date data are available for use in making projections. Unfortunately, such data are not available in most states, including Mississippi. Calculations presented in Table 6 illustrate the magnitude of the differences that result from using the relatively high age-specific bed need assumptions. The table compares the bed need projection published in the 2007 MSHP with the bed need estimates that would result from using the reported national use rates or the documented lower Virginia rates. Use of the national averages would reduce the projected 2009 bed need from more than 8,250 beds to about 1,400 beds (Table 6). The majority of the reduction would come from the lower use rates applied to the two older age groups (those 75 ears of age and older).

Applying the lower Virginia age-specific use rates would eliminate the projected bed need, converting the projected 8,254 statewide deficit to a projected statewide surplus of more than 450 beds. Using the Virginia rates would result in a projected bed need in two planning districts and substantial bed surpluses in two (Table 6). Applying the rates used in other peer states also would reduce the projected Mississippi bed need. In addition to Virginia, application of the Georgia or North Carolina rates would result in conversion of the bed deficit to a surplus statewide and in most long-term care planning districts. Application of the documented North Carolina use rates would produce the lowest bed need estimate. Even use of the relatively high Tennessee rates, which have not been documented in recent years, would reduce the projected Mississippi surplus by more than 2,000 beds.

A similar pattern emerges from the application of rates from peer states that use a crude single use rate. Alabama and South Carolina, project nursing home bed need by applying a derived single use rate per 1,000 persons 65 years of age and older. Alabama uses a rate of 40 beds per 1,000 elderly. South Carolina uses 39 beds per 1,000. [14] Application of these rates in Mississippi would produce bed need projections that would reduce the projected deficit from more than 8,250 beds to fewer than 1,000 beds.

These data and the experience in peer states over the last decade suggest that the Mississippi use rates used to project nursing bed need should be lowered substantially. Without age-specific Mississippi use data it is not possible to say precisely what the Mississippi rate(s) should be and whether they should be applied statewide, regionally (by LTCPD) or, as is the case in some states, at the county level. Without a significant reduction in the rates, the discontinuity between the projected MSHP bed need and day-to-day operational realities will grow. Similarly, any practical hope of eventually lifting the legislatively imposed moratorium on nursing home development, and returning to planning-based CON regulation, is likely to depend on identifying and applying indigenous state and community nursing home use rates.

Consideration should be given to conducting periodic statewide patient origin surveys of nursing facilities and patients to obtain the information needed to identify and document indigenous Mississippi use rates. Currently, there is no database or source that produces these data. Surveys to obtain the necessary data could be part of the annual licensure survey and reporting process or conducted separately. In North Carolina data are collected with the annual licensure survey. Virginia conducts separate quadrennial surveys. There are advantages and disadvantages with either approach. The North Carolina approach obtains data more frequently, permitting more frequent updates of the health plan. The Virginia approach obtains more information, much of which is not needed annually, that permits ready identification of regional and local (county, city, zip code) variation in demand and use. The Virginia approach, which has both patient and facility oriented data elements, also permits nursing home use to be analyzed from both community and facility perspectives.

Table 6
Projected Nursing Home Beed Need
Alternate Use Rates
Mississippi, 2007

Current Estimation Formula: MSHP Bed Need Formula

Long-Term Care Planning District	Population 0 - 64 Years	Bed Need (0.5/1,000)	Population 65 - 74 Years	Bed Need (14/1,000)	Population 75 - 84 Years	Bed Need (59/1,000)	Population 85+ Years	Bed Need (179/1,000)	Total Bed Need	# Beds in Abeyance	Licensed/CON-Approved Beds	Difference
District I	475,794	238	37,367	523	26,708	1,576	12,510	2,239	4,576	122	3,249/140	1,065
District II	499,251	250	44,952	629	33,888	1,999	15,890	2,844	5,723	15	4,106	1,602
District III	690,052	345	54,539	764	40,274	2,376	18,881	3,380	6,864	17	4,659	2,188
District IV	868,516	434	76,450	1,070	55,415	3,269	25,064	4,486	9,260	360	5,098/403	3,399
State Total	***2,533,613***	***1,267***	***213,308***	***2,986***	***156,285***	***9,221***	***72,345***	***12,950***	***26,424***	***514***	***17,112 / 543***	***8,254***

Alternate Estimation Formula: National Age Specific Use Rates (2004)

Long-Term Care Planning District	Population 0 - 64 Years	Bed Need (0.7/1,000)	Population 65 - 74 Years	Bed Need (9.4/1,000)	Population 75 - 84 Years	Bed Need (36.1/1,000)	Population 85+ Years	Bed Need (138.7/1,000)	Total Bed Need	# Beds in Abeyance	Licensed/CON-Approved Beds	Difference
District I	475,794	333	37,367	351	26,708	964	12,510	1,735	3,384	122	3,249/140	-27
District II	499,251	349	44,952	423	33,888	1,223	15,890	2,204	4,199	15	4,106	68
District III	690,052	483	54,539	513	40,274	1,454	18,881	2,619	5,068	17	4,659	426
District IV	868,516	608	76,450	719	55,415	2,000	25,064	3,476	6,803	360	5,098/403	942
State Total	***2,533,613***	***1,774***	***213,308***	***2,005***	***156,285***	***5,642***	***72,345***	***10,034***	***19,455***	***514***	***17,112 / 543***	***1,409***

Alternate Estimation Formula II : Virginia Age Specific Use Rates (2004)

Long-Term Care Planning District	Population 0 - 64 Years	Bed Need (0.4/1,000)	Population 65 - 74 Years	Bed Need (8.3/1,000)	Population 75 - 84 Years	Bed Need (32.7/1,000)	Population 85+ Years	Bed Need (131.7/1,000)	Total Bed Need	# Beds in Abeyance	Licensed/CON-Approved Beds	Difference
District I	475,794	190	37,367	310	26,708	873	12,510	1,648	3,021	122	3,249/140	-490
District II	499,251	200	44,952	373	33,888	1,108	15,890	2,093	3,774	15	4,106	-347
District III	690,052	276	54,539	453	40,274	1,317	18,881	2,487	4,532	17	4,659	144
District IV	868,516	347	76,450	635	55,415	1,812	25,064	3,301	6,095	360	5,098/403	234
State Total	***2,533,613***	***1,013***	***213,308***	***1,770***	***156,285***	***5,111***	***72,345***	***9,528***	***17,422***	***514***	***17,112/543***	***-459***

Source: Mississipi State Health Plan, 2007; CDC, NCHS, National Nursing Home Survey. Health, United States 2006; Virginia Statewide Nursing Home Patient Origin Surgey, 2002 & 2006.

Either method would be a significant improvement over current practices. Given current circumstances, the periodic surveys conducted in Virginia appear better suited to meeting Mississippi planning needs. Attachment 1 (Appendix A) contains a sample survey instrument that might be used. Collecting and analyzing the data called for in the survey would permit planners to identify and compare:

- Age and gender specific use rates for all areas and jurisdictions in the state;
- Nursing care service markets and medical trade patterns;
- Primary and secondary service areas for nursing care facilities;
- Intrastate private and public market differences;
- Age and payer mix differences within regional markets and nursing care facilities;
- Nursing home admissions age and gender variations; and
- Sources of nursing home patients.

Collection of these data over time would permit use patterns and trends specific to Mississippi to be identified. A single survey would identify and document current age and gender specific nursing home use rates. This is the necessary first step to improve planning for nursing home services.

Conducting a statewide patient origin survey of all nursing facilities and patients also could be the necessary first step toward lifting the moratorium on nursing home development. The moratorium cannot be lifted under the current conditions where the MSHP indicates there is a public need for thousands of additional nursing home beds. The state Medicaid budget simply could not accommodate the implied increase in long-term care nursing expense. Were a data collection system in place, and evidence that the bed need projections based on the data collected are reliable and realistic, serious consideration could be given to lifting the moratorium and returning to a more orthodox planning posture. Once accurate data are available and there is confidence that current bed need has been documented, and that it is possible to project future bed need reliably, the reasons and justification for maintaining a moratorium are likely to disappear.

The moratorium could be replaced with a planning process based on an annual call or request for applications. The request for applications (RFA) would be based on bed need determinations where projected bed need would be based on

- Nursing home use rates derived from the most recent statewide survey;
- Average regional (or county, if preferred) occupancy levels of 90% or greater over the preceding three years;
- The pending availability of licensed beds previously authorized but not yet open;
- Compatibility of the projected bed need with state Medicaid program policy and budget considerations.

The annual request for applications, issued by MDH, would control nursing home application submissions. Applications would be accepted only for areas (regions or counties) specified in the RFA. Table 7 illustrates the implications of such a process,

Table 7
Mississippi Nursing Home Capacity and Use
Beds Permitted by Request for Applications (RFA)
Beds Permitted Under Alternative RFA Occupancy Thresholds
Mississippi, 2005

Facility	County	Licensed Beds	Patient Days	Average Daily Census	Medicare Beds	Medicaid Beds	Occupancy (Percent)	Beds Permitted Under RFA Occupancy Threshold 90%	93%	95%
Long Term Care Planning District 1										
Attala County Nursing Center	Attala	120	39,331	107.8	120	120	89.8			
Attala County		***120***	***39,331***	***107.8***	***120***	***120***	***89.8***			
Bolivar Health & Rehab Center	Bolivar	75	20,736	56.8	75	75	75.8			
Bolivar Medical Center	Bolivar	35	12,659	34.7	0	35	99.1			
Cleveland Nursing & Rehab Ctr	Bolivar	120	37,057	101.5	120	120	84.6			
Oak Grove Retirement Home	Bolivar	60	18,161	49.8	0	60	82.9			
Shelby Nursing & Rehab	Bolivar	60	20,236	55.4	60	60	92.4			
Bolivar County		***350***	***108,849***	***298.2***	***255***	***350***	***85.2***			
Vaiden Community Living Center	Carroll	60	20,120	55.1	60	60	91.9			
Carroll County		***60***	***20,120***	***55.1***	***60***	***60***	***91.9***	Yes		
Clarksdale Nursing Center	Coahoma	112	35,573	97.5	112	112	81.5			
Greenbough Nursing Center	Coahoma	66	19,855	54.4	66	66	82.4			
Coahoma County		***178***	***55,428***	***151.9***	***178***	***178***	***85.3***			
Beverly Healthcare Southaven	DeSoto	140	49,809	136.5	140	140	97.5			
DeSoto Healthcare Center	DeSoto	120	40,141	110.0	120	120	91.7			
Landmark of DeSoto	DeSoto	60	20,275	55.6	60	60	92.6			
Desoto County		***320***	***110,225***	***302.0***	***320***	***320***	***94.4***	Yes	Yes	
Grace Health & Rehab of Grenad	Grenada	137	42,212	115.7	137	137	84.4			
Grenada Living Center	Grenada	120	41,120	112.7	120	120	93.9			
Grenada County		***257***	***83,332***	***228.3***	***257***	***257***	***88.8***			
Lexington Manor Nursing Center	Holmes	68	23,596	64.7	68	68	95.1			
University Hospital Nursing Ct	Holmes	80	26,581	72.8	0	80	91.0			
Holmes County		***148***	***50,177***	***137.5***	***68***	***148***	***92.9***	Yes		
Humphreys County Nursing Ctr	Humphreys	60	19,229	52.7	60	60	87.8			
Humphreys County		***60***	***19,229***	***52.7***	***60***	***60***	***87.8***			
Crystal Health & Rehab of Gree	Leflore	110	30,781	84.3	110	110	76.7			
Golden Age	Leflore	180	63,928	175.1	180	180	97.3			
Riverview Nursing & Rehab Ctr	Leflore	120	32,096	87.9	120	120	73.3			
Leflore County		***410***	***126,805***	***347.4***	***410***	***410***	***84.7***			
Winona Manor Nursing Home	Montgomery	120	42,545	116.6	120	120	97.1			
Montgomery County		***120***	***42,545***	***116.6***	***120***	***120***	***97.1***	Yes	Yes	Yes
Beverly Healthcare Batesville	Panola	130	44,648	122.3	130	130	94.1			
Sardis Community Nursing Home	Panola	60	19,869	54.4	60	60	90.7			
Panola County		***190***	***64,517***	***176.8***	***190***	***190***	***93.0***	Yes	Yes	
Quitman County Nursing Home	Quitman	60	21,450	58.8	0	60	97.9			
Quitman County		***60***	***21,450***	***58.8***	***0***	***60***	***97.9***	Yes	Yes	Yes

Table 7
Mississippi Nursing Home Capacity and Use
Beds Permitted by Request for Applications (RFA)
Beds Permitted Under Alternative RFA Occupancy Thresholds
Mississippi, 2005

Facility	County	Licensed Beds	Patient Days	Average Daily Census	Medicare Beds	Medicaid Beds	Occupancy (Percent)	Beds Permitted Under RFA Occupancy Threshold 90%	93%	95%
Indianola Health & Rehab Ctr	Sunflower	75	24,082	66.0	75	75	88.0			
Ruleville Nursing & Rehab Ctr	Sunflower	109	26,794	73.4	109	109	67.4			
Walter B. Crook Nursing Fac	Sunflower	60	21,769	59.6	60	60	99.4			
Sunflower County		***244***	***72,645***	***199.0***	***244***	***244***	***81.6***			
Tallahatchie General Hospital	Tallahatchie	68	23,254	63.7	0	68	93.7			
Tallahatchie County		***68***	***23,254***	***63.7***	***0***	***68***	***93.7***	Yes	Yes	
Senatobia Convalescent Center	Tate	120	41,564	113.9	120	120	94.9			
Tate County		***120***	***41,564***	***113.9***	***120***	***120***	***94.9***	Yes	Yes	Yes
Tunica Nursing Home	Tunica	60	18,450	50.6	0	60	84.3			
Tunica County		***60***	***18,450***	***50.6***	***0***	***60***	***84.3***			
Arnold Avenue Nursing Home	Washington	60	16,990	46.6	60	60	77.6			
Autumn Leaves Nursing Home	Washington	60	16,960	46.5	60	60	77.4			
Legacy Manor Nursing & Rehhab	Washington	60	19,644	53.8	60	60	89.7			
MS Care Ctr of Greenville	Washington	116	40,704	111.5	116	116	96.1			
Washington Care Center	Washington	60	4,534	19.1	60	60	31.9			
Washington County		***356***	***98,832***	***277.5***	***356***	***356***	***76.1***			
Yalobusha County Nursing Home	Yalobusha	120	28,833	79.0	0	120	65.8			
Yaobusha County		***120***	***28,833***	***79.0***	***0***	***120***	***65.8***			
Total LTCPD 1		***6,362***	***2,022,339***	***5,554***	***5,516***	***6,362***	***87.1***	No	No	No
				Long Term Care Planning District 2						
Cornerstone Health & Rehab of	Alcorn	95	30,935	84.8	95	95	89.2			
MS Care Ctr of Alcorn County	Alcorn	125	42,438	116.3	125	125	93.0			
Whitfield Nursing Home	Alcorn	44	15,243	41.8	0	44	94.9			
Alcorn County		***264***	***88,616***	***242.8***	***220***	***264***	***92.0***	Yes		
Briar Crest Extended Care	Benton	60	18,727	51.3	60	60	85.5			
Benton County		***60***	***18,727***	***51.3***	***60***	***60***	***85.5***			
Bruce Nursing Center	Calhoun	35	12,494	34.2	0	35	97.8			
Calhoun County Nursing Home	Calhoun	120	39,648	108.6	0	120	90.5			
Calhoun County		***155***	***52,142***	***142.9***	***0***	***155***	***92.2***	Yes		
Floy Dyer Manor	Chickasaw	66	23,988	65.7	66	66	99.6			
Shearer Richardson Memorial NH	Chickasaw	73	23,256	63.7	0	73	87.3			
Chickasaw County		***139***	***47,244***	***129.4***	***66***	***139***	***93.1***	Yes	Yes	
Choctaw County Nursing Center	Choctaw	73	19,308	52.9	0	73	72.5			
Choctaw County		***73***	***19,308***	***52.9***	***0***	***73***	***72.5***			
Dugan Memorial Home	Clay	60	21,093	57.8	60	60	96.3			
West Point Community Living Ct	Clay	120	28,002	76.7	120	120	63.9			
Clay County		***180***	***49,095***	***134.5***	***180***	***180***	***74.7***			
Courtyards Community Living Ct	Itawamba	66	20,562	56.3	66	66	85.4			
Daniel Health Care	Itawamba	130	45,442	124.5	130	130	95.8			
Itawamba		***196***	***66,004***	***180.8***	***196***	***196***	***92.3***	Yes		
Graceland Care Ctr of Oxford	Lafayette	180	59,531	163.1	180	180	90.6			
Lafayette County		***180***	***59,531***	***163.1***	***180***	***180***	***90.6***	Yes		

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Facility	County	Licensed Beds	Patient Days	Average Daily Census	Medicare Beds	Medicaid Beds	Occupancy (Percent)	Beds Permitted Under RFA Occupancy Threshold 90%	93%	95%
Beverly Healthcare Eason	Lee	120	42,781	117.2	120	120	97.7			
Cedars Health Center	Lee	140	50,406	138.1	140	140	98.6			
NMMC Baldwyn Nursing Facility	Lee	107	38,218	104.7	107	107	97.9			
Tupelo Nursing & Rehab Center	Lee	120	41,355	113.3	120	120	94.4			
Lee County		***487***	***172,760***	***473.3***	***487***	***487***	***97.2***	Yes	Yes	Yes
Aurora Australis Lodge	Lowndes	120	35,042	96.0	120	120	80.0			
The Windsor Place Nursing & Re	Lowndes	140	48,545	133.0	140	140	95.0			
Trinity Healthcare Center	Lowndes	60	21,393	58.6	60	60	97.7			
Vineyard Court Nursing Center	Lowndes	60	17,248	47.3	60	60	78.8			
Lowndes		**380**	**122,228**	**334.9**	**380**	**380**	***88.1***			
Trinity Mission Health & Rehab	Marshall	60	11,741	35.2	60	60	58.6			
Trinity Mission Health & Rehab	Marshall	120	41,795	114.5	120	120	95.4			
Marshall County		***180***	***53,536***	***149.7***	***180***	***180***	***81.5***			
Beverly Healthcare Amory	Monroe	152	51,833	142.0	152	152	93.4			
Care Center of Aberdeen	Monroe	120	33,999	93.2	120	120	77.6			
River Place Nursing Center	Monroe	60	19,819	54.3	60	60	90.5			
Monroe County		***332***	***105,651***	***289.5***	***332***	***332***	***87.2***			
Noxubee County Nursing Home	Noxubee	60	20,398	55.9	0	60	93.1			
Noxubee County		***60***	***20,398***	***55.9***	***0***	***60***	***93.1***	Yes	Yes	
Carrington Nursing Center	Oktibbeha	60	18,365	50.3	60	60	83.9			
Starkville Manor Healthcare	Oktibbeha	119	37,004	101.4	119	119	85.2			
Oktibbeha County		**179**	**55,369**	**151.7**	**179**	**179**	***84.7***			
Graceland Care Ctr of Pontotoc	Pontotoc	60	21,052	57.7	60	60	96.1			
Pontotoc Nursing Home	Pontotoc	44	15,986	43.8	0	44	99.5			
Sunshine Health Care	Pontotoc	60	21,025	57.6	0	60	96.0			
Pontotoc Nursing Home		***164***	***58,063***	***159.1***	***60***	***164***	***97.0***	Yes	Yes	Yes
Longwood Community Living Ctr	Prentiss	64	13,003	35.6	64	64	55.7			
The Landmark Nursing & Rehab	Prentiss	80	28,564	78.3	0	80	97.8			
Prentiss County		***144***	***41,567***	***113.9***	***64***	***144***	***79.1***			
Beverly Healthcare Ripley	Tippah	140	47,398	129.9	140	140	92.8			
Rest Haven Nursing Home	Tippah	60	19,336	53.0	60	60	88.3			
Tippah County Nursing Home	Tippah	40	14,522	39.8	40	40	99.5			
Tippah County		***240***	***81,256***	***222.6***	***240***	***240***	***92.8***	Yes		
Tishomingo Community Living Ct	Tishomingo	73	24,096	66.0	73	73	90.4			
Tishomingo Manor	Tishomingo	105	34,417	94.3	105	105	89.8			
Tishmingo County		***178***	***58,513***	***160.3***	***178***	***178***	***90.1***	Yes		
Graceland Care Ctr of New Alba	Union	120	39,724	108.8	120	120	90.7			
Union County Health & Rehab	Union	60	11,728	42.7	60	60	71.1			
Union County		***180***	***51,452***	***151.5***	***180***	***180***	***78.3***			
Beverly Healthcare Eupora	Webster	119	42,085	115.3	119	119	96.9			
Webster Health Services	Webster	36	12,742	34.9	0	36	97.0			
Webster County		***155***	***54,827***	***150.2***	***119***	***155***	***96.7***	Yes	Yes	

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Care Center of Louisville	Winston	60	20,871	57.2	60	60	95.3			
Winston County Nursing Home	Winston	120	39,064	107.0	120	120	89.2			
Winston County		***180***	***59,935***	***164.2***	***180***	***180***	***91.2***	Yes		
Total LTCPD 2		***8,032***	***2,612,509***	***7,185***	***6,782***	***8,032***	***89.1***	No	No	No
				Long Term Care Planning District 3						
Adams County Nursing Center	Adams	105	36,920	101.2	105	105	96.3			
Glenburney Healthcare	Adams	96	26,813	73.5	96	96	76.5			
Trace Haven Health & Rehab	Adams	58	19,331	53.0	58	58	91.3			
Adams County		***259***	***83,064***	***227.6***	***259***	***259***	***87.9***			
Liberty Community Living Ctr	Amite	80	28,642	78.5	80	80	98.1			
Amite County		***80***	***28,642***	***78.5***	***80***	***80***	***98.1***	Yes	Yes	Yes
Claiborne County Nursing Ctr	Claiborne	77	23,423	64.2	77	77	83.3			
Claiborne County		***77***	***23,423***	***64.2***	***77***	***77***	***83.3***			
Copiah Living Center	Copiah	60	21,012	57.6	60	60	95.9			
Pine Crest Guest Home	Copiah	120	38,294	104.9	120	120	87.4			
Copiah County		***180***	***59,306***	***162.5***	***180***	***180***	***90.3***	Yes		
Meadville Convalescent Home	Franklin	**60**	21,319	58.4	8	**52**	97.4			
Franklin County		***60***	***21,319***	***58.4***	***8***	***52***	***97.4***	Yes	Yes	Yes
Belhaven Nursing Center	Hinds	60	19,869	54.4	60	60	90.7			
Care Center of Clinton	Hinds	121	41,994	115.1	121	121	95.1			
Chadwick Nursing & Rehab	Hinds	100	35,311	96.7	100	100	96.7			
Community Place	Hinds	60	20,375	55.8	60	60	93.0			
Compere's Nursing Home	Hinds	60	21,353	58.5	60	60	97.5			
Cottage Grove Nursing Home	Hinds	120	31,731	86.9	0	120	72.5			
Forest Hill Nursing Center	Hinds	87	29,525	80.9	87	87	93.0			
Hinds County Nursing & Rehab	Hinds	100	30,172	82.7	100	100	80.2			
Lakeland Nursing & Rehab	Hinds	105	37,520	102.8	105	105	97.9			
Magnolia Nursing Center	Hinds	60	20,554	56.3	60	60	93.9			
Manhattan Nursing & Rehab Ctr	Hinds	180	64,030	175.4	180	180	97.5			
Pleasant Hills	Hinds	120	32,557	89.2	120	120	74.3			
Trinity Mission Health & Rehab	Hinds	145	49,297	135.1	145	145	93.1			
Willow Creek Retirement Center	Hinds	88	31,228	85.6	88	88	97.2			
Hinds County		***1,406***	***465,516***	***1,275.4***	***1,286***	***1,406***	***90.7***	Yes		
Jefferson County Nursing Home	Jefferson	60	19,242	52.7	60	60	87.9			
Jefferson County		***60***	***19,242***	***52.7***	***60***	***60***	***87.9***			
Lawrence County Nursing Center	Lawrence	60	20,944	57.4	60	60	95.6			
Lawrence County		***60***	***20,944***	***57.4***	***60***	***60***	***95.6***	Yes	Yes	Yes
Beverly Healthcare Brookhaven	Lincoln	58	20,817	57.0	58	58	98.3			
Countrybrook Living Center	Lincoln	121	41,113	112.6	121	121	93.1			
Haven Hall Healthcare Center	Lincoln	81	27,117	74.3	81	81	91.7			
Silver Cross Home	Lincoln	60	19,374	53.1	60	60	88.5			
Lincoln County		***320***	***108,421***	***297.0***	***320***	***320***	***92.8***	Yes		

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Highland Home	Madison	120	41,584	113.9	120	60	94.9			
Madison County Nursing Home	Madison	95	33,816	92.7	0	95	97.5			
St Catherine's Village Siena C	Madison	120	41,955	114.9	0	0	95.8			
The Arbor	Madison	60	20,534	56.3	0	0	93.8			
The Nichols Center	Madison	60	20,427	56.0	60	60	93.3			
Madison County		***455***	***158,316***	***433.7***	***180***	***215***	***95.3***	Yes	Yes	Yes
Camellia Estates	Pike	30	10,146	27.8	30	0	92.7			
McComb Extended Care	Pike	145	47,897	131.2	145	145	90.5			
McComb Nursing & Rehab Center	Pike	140	48,785	133.7	140	140	95.5			
Pike County		***315***	***106,828***	***292.7***	***315***	***285***	***92.9***	Yes		
Brandon Court	Rankin	100	34,012	93.2	40	60	93.2			
Brandon Nursing & Rehab Center	Rankin	230	79,894	218.9	230	230	95.2			
Briar Hill Rest Home	Rankin	60	21,758	59.6	60	60	99.4			
Methodist Specialty Care Ctr	Rankin	60	16,724	45.8	0	60	76.4			
Rankin County		***450***	***152,388***	***417.5***	***330***	***410***	***92.8***	Yes		
Heritage Manor Rolling Fork	Sharkey	54	17,651	48.4	54	54	89.6			
Sharkey County		***54***	***17,651***	***48.4***	***54***	***54***	***89.6***			
Bedford Care Ctr of Mendenhall	Simpson	60	20,108	55.1	60	60	91.8			
Hillcrest Nursing Center	Simpson	120	41,017	112.4	120	120	93.7			
Simpson County		***180***	***61,125***	***167.5***	***180***	***180***	***93.0***	Yes	Yes	
Beverly Healthcare Tylertown	Walthall	60	21,503	58.9	60	60	98.2			
Billdora Nursing Home	Walthall	77	26,883	73.7	77	77	95.7			
Walthall County		***137***	***48,386***	***132.6***	***137***	***137***	***96.8***	Yes	Yes	Yes
Covenant Health & Rehab of Vic	Warren	120	37,977	104.1	120	120	86.7			
Heritage House Nursing Center	Warren	60	21,274	58.3	60	60	97.1			
River Region Skilled Nursing	Warren	25	4,328	11.9	25	25	44.0			
Shady Lawn Nursing Home	Warren	100	30,936	84.8	100	100	84.8			
Vicksburg Convalescent Home	Warren	100	34,740	95.2	100	100	95.2			
Warren County		***405***	***129,255***	***354.1***	***405***	***405***	***87.4***			
Wilkinson County Nursing Ctr	Wilkinson	105	26,588	72.8	105	105	69.4			
Wilkinson County		***105***	***26,588***	***72.8***	***105***	***105***	***69.4***			
Martha Coker Convalescent Home	Yazoo	41	14,519	39.8	0	0	97.0			
Yazoo City Health & Rehab Ctr	Yazoo	180	60,612	166.1	180	180	92.3			
Yazoo County		***221***	***75,131***	***205.8***	***180***	***180***	***93.1***	Yes	Yes	
Total LTCPD 3		***9427***	***3135959***	***8591.64***	***8252***	***8750***	***91.1***	Yes	No	No
				Long Term Care Planning District 4						
H.C. Watkins Memorial Hospital	Clarke	15	5,158	14.1	0	15	94.2			
Lakeside Living Center	Clarke	120	43,261	118.5	120	120	98.8			
Clarke County		***135***	***48,419***	***132.7***	***120***	***135***	***98.3***	Yes	Yes	Yes
Covington County Nursing Ctr	Covington	60	20,796	57.0	60	60	95.0			
Covington County		***60***	***20,796***	***57.0***	***60***	***60***	***95.0***	Yes	Yes	Yes

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Bedford Care Ctr Monroe Hall	Forrest	90	30,038	82.3	90	90	91.4			
Bedford Care Ctr of Hattiesbur	Forrest	162	49,096	134.5	162	162	83.0			
Bedford Care Ctr of Petal	Forrest	60	21,009	57.6	60	60	95.9			
Hattiesburg Convalescent Ctr	Forrest	184	63,294	173.4	0	184	94.2			
Forrest County		***496***	***163,437***	***447.8***	***312***	***496***	***90.3***	Yes		
Glenoaks Nursing Center	George	60	20,354	55.8	60	60	92.9			
George County		***60***	***20,354***	***55.8***	***60***	***60***	***92.9***	Yes		
Brookwood Manor Nursing Center	Greene	60	18,341	50.3	60	60	83.8			
Greene Rural Health Center	Greene	60	20,930	57.3	60	60	95.6			
Greene County		***120***	***39,271***	***107.6***	***120***	***120***	***89.7***			
Woodland Village Nursing Ctr	Hancock	132	45,845	125.6	132	132	95.2			
Hancock County		***132***	***45,845***	***125.6***	***132***	***132***	***95.2***	Yes	Yes	Yes
Biloxi Community Living Center	Harrison	240	47,200	129.3	240	240	53.9			
Dixie White House Nursing Home	Harrison	60	21,354	58.5	60	60	97.5			
Driftwood Nursing Center	Harrison	151	47,860	131.1	151	151	86.8			
Lakeview Nursing Center	Harrison	105	35,986	98.6	105	105	93.9			
The Boyington	Harrison	120	37,966	104.0	120	120	86.7			
Harrison County		***676***	***190,366***	***521.6***	***676***	***676***	***77.2***			
Ocean Springs Nursing Center	Jackson	115	36,879	101.0	115	115	87.9			
Plaza Community Living Center	Jackson	120	40,353	110.6	120	120	92.1			
River Chase Village	Jackson	60	17,077	46.8	60	60	78.0			
Singing River Rehab & Nursing	Jackson	160	41,580	113.9	160	160	71.2			
Sunplex Subacute Center	Jackson	73	26,024	71.3	73	73	97.7			
Jackson County		***528***	***161,913***	***443.6***	***528***	***528***	***84.0***			
Jasper County Nursing Home	Jasper	110	39,734	108.9	0	110	99.0			
Jasper County		***110***	***39,734***	***108.9***	***0***	***110***	***99.0***	Yes	Yes	Yes
Jefferson Davis Community Hosp	Jeff Davis	60	21,608	59.2	60	60	98.7			
Jefferson Davis County		***60***	***21,608***	***59.2***	***60***	***60***	***98.7***	Yes	Yes	Yes
Care Center of Laurel	Jones	130	40,531	111.0	130	130	85.4			
ComfortCare Nursing Center	Jones	126	45,578	124.9	0	126	99.1			
Jones County Rest Home	Jones	122	0	.	122	122	.			
Laurelwood Community Living Ct	Jones	60	18,523	50.8	60	60	84.6			
Jones County		***438***	***104,632***	***286.7***	***312***	***438***	***65.4***			
MS Care Ctr of Dekalb	Kemper	60	21,394	58.6	60	60	97.7			
Kemper County		60	21,394	58.6	60	60	97.7			
Oxford Health & Rehab Center	Lamar	120	34,355	94.1	120	120	78.4			
Windham House of Hattiesburg	Lamar	60	19,313	52.9	60	30	88.2			
Lamar County		***180***	***53,668***	***147.0***	***180***	***150***	***81.7***			

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Beverly Healthcare Broadmoor	Lauderdale	120	42,995	117.8	120	120	98.2			
Guardian Angel Healthcare	Lauderdale	128	38,717	106.1	128	128	82.9			
Meridian Community Living Ctr	Lauderdale	58	18,385	50.4	58	58	86.8			
Poplar Springs Nursing Center	Lauderdale	130	18,972	52.0	130	130	44.1			
Queen City Nursing Center	Lauderdale	84	30,554	83.7	84	84	99.7			
Reginald P. White Nursing Fac	Lauderdale	228	69,183	189.5	0	228	83.1			
Riley Healthcare	Lauderdale	82	28,226	77.3	82	82	94.3			
Lauderdale County		***830***	***247,032***	***676.8***	***602***	***830***	***81.5***			
Carthage Health Care Center	Leake	99	29,696	81.4	99	99	82.2			
Leake Memorial ECF	Leake	44	16,008	43.9	0	44	99.7			
Leake County		***143***	***45,704***	***125.2***	***99***	***143***	***87.6***			
Columbia Health & Rehab	Marion	119	38,962	106.7	119	119	89.7			
The Grove	Marion	80	27,564	75.5	0	80	94.4			
The Myrtles Nursing Center	Marion	98	33,804	92.6	98	98	94.5			
Marion County		***297***	***100,330***	***274.9***	***217***	***297***	***92.6***	Yes		
Choctaw Residential Center	Neshoba	120	42,621	116.8	0	120	97.3			
Hilltop Manor Nursing Center	Neshoba	60	21,217	58.1	60	60	96.9			
Neshoba County Nursing Home	Neshoba	148	53,555	146.7	148	148	99.1			
Neshoba County		***328***	***117,393***	***321.6***	***208***	***328***	***98.1***	Yes	Yes	Yes
Bedford Care Ctr of Newton	Newton	120	41,269	113.1	120	120	94.2			
Newto n County		***120***	***41,269***	***113.1***	***120***	***120***	***94.2***	Yes	Yes	
Covenant Health & Rehab of Pic	Pearl River	120	23,689	86.8	120	120	72.3			
Pearl River County Nursing Hom	Pearl River	126	33,527	91.9	0	126	72.9			
Pearl River		***246***	***57,216***	***178.6***	***120***	***246***	***63.7***			
Perry County Nursing Center	Perry	60	20,985	57.5	60	60	95.8			
Perry County		***60***	***20,985***	***57.5***	***60***	***60***	***95.8***	Yes	Yes	Yes
Lackey Convalescent Home	Scott	20	6,954	19.1	0	0	73.8			
MS Care Ctr of Morton	Scott	120	43,152	118.2	120	120	98.5			
Scott County		***140***	***50,106***	***137.3***	***120***	***120***	***98.1***	Yes	Yes	Yes
Rolling Acres Retirement Ctr	Smith	121	37,025	101.4	0	121	83.8			
Smith County		***121***	***37,025***	***101.4***	***0***	***121***	***83.8***			
Azalea Gardens Nursing Center	Stone	149	28,541	78.2	12	137	52.5			
Stone County Nursing & Rehab	Stone	59	10,414	28.5	59	20	48.4			
Stone County		***208***	***38,955***	***106.7***	***71***	***157***	***51.3***			
Pine View Health Care Center	Wayne	90	31,259	85.6	90	90	95.2			
Wayne County		***90***	***31,259***	***85.6***	***90***	***90***	***95.2***	Yes	Yes	Yes
Total LTCPD 4		***11,186***	***3,406,163***	***9,376***	***8,564***	***10,984***	***83.4***	No	No	No
State Total		***35,007***	***11,176,970***	***30,706***	***29,114***	***34,128***	***87.5***	No	No	No

Source: Data, Mississippi State Department of Health, Division of Licensure and Certification, 2006; Calculations AHPA, 2007.

absent any consideration of Medicaid program budgetary or policy implications, had it been instituted in 2005. The model assumes that reported 2005 nursing home use data reflects the average of the previous three years and that recent use levels approximate actual demand. The model suggests that, once actual nursing home use rates are documented and realistic bed need projections are developed, replacing the moratorium with a stable, data-driven planning process contains little risk.

D. Conclusions and Findings

Effective planning for long-term nursing care services has proven unusually difficult. Few states have data systems that provide the information needed to analyze and explain the paradox of population aging and decreasing nursing home demand. The failure to plan effectively has led to decreasing nursing home occupancy and to operating inefficiencies in many states. It also has led to the imposition of moratoria on nursing home development in the majority of states over the last two decades.

Mississippi has one of the longer running moratoria on nursing home development. It reflects, and effectively mediates, the substantial conflict between official nursing home bed need projections, likely actual need, and the ability to support economically projected service needs. Unless the long-term nursing care service planning process is rationalized, these discontinuities will continue to grow.

Demand for nursing home care in Mississippi has increased in both absolute and relative terms over the last three decades. Among neighboring and peer states, Mississippi has the second highest nursing home resident to elderly population ratio. Notwithstanding the comparatively high use levels, the nearly two decades long moratorium on development, and projected need for thousands of additional beds, there is considerable reason to believe that current capacity and demand are reasonably in balance.

The formula used to project nursing home bed need is dated. The age-specific rates used to project bed need are substantially higher than those used in most peer states and the reported national rates. Data are not available to permit calculation of the actual age-specific use rates in Mississippi, but there is little reason to believe that they should be, or are, substantially higher than the average or median peer state experience. The difference between the age-specific use rates used in Mississippi and those used in most peer states is substantially greater than demographic variation suggests. Application of the use rates of peer states would either eliminate or greatly reduce the projected bed need.

These data and the experience in peer states over the last decade suggest that the use rates used to project nursing care bed need in Mississippi should be lowered substantially. Without indigenous age-specific use data it is not possible to say precisely what the Mississippi rate(s) should be and whether they should be applied statewide, regionally (by LTCPD) or at the county level. Without a significant reduction in the rates, the discontinuity between the projected MSHP bed need and day-to-day operational realities will grow.

Consideration should be given to conducting period statewide patient origin surveys of nursing facilities and patients to obtain the information needed to document indigenous Mississippi use rates. Conducting a statewide patient origin survey of all nursing facilities and patients is the necessary first step in rationalizing long-term nursing care services planning and toward lifting the moratorium on nursing home development. When accurate data are available, and there is confidence that current bed need has been documented and that it is possible to project future bed need reliably, the arguments for maintaining the moratorium become less persuasive.

The moratorium could be replaced with a planning process based on an annual call or request for applications. The request for applications (RFA) would control nursing home application submissions. Applications would be accepted only for areas (regions or counties) specified in the RFA. Once actual nursing home use rates are documented and realistic bed need projections are developed, replacing the moratorium with a stable, data-driven planning process presents little risk. Attachments II-A and II-B (Appendix A) describes the Virginia Request for Applications program and associated nursing home bed need determination methodology.

E. Recommendations

***Data Collection*:** In consultation and collaboration with affected and interested parties, the Mississippi State Department of Health should conduct periodic statewide patient origin surveys of all licensed nursing facilities. These surveys should be conducted no less frequently than at five-year intervals. The initial survey should be undertaken as soon as possible, preferably in calendar year 2008. The facility and patient-level information collected should include the data elements shown in the sample survey instrument presented in Attachment I, Appendix A.

***Nursing Home Bed Need Formula*:** The formula used to project future nursing home bed need should be modified. It should be replaced with a formula that incorporates the age and gender specific use rates that are documented by the statewide patient origin survey.

If survey results warrant, consideration should be given to applying indigenous use rates differentially, e.g., by long-term care planning district, county, or other aggregations of counties.

In the event it is not possible to begin conducting statewide patient origin surveys within the next two years, the bed need formula should be modified to reflect the average or median use rate of peer states that base their rates on contemporaneous data collected statewide.

Nursing Home Moratorium: The moratorium on nursing home development should be lifted when the data collection program is in place and the formula used to project nursing home bed need has been normalized. It should be replaced with a planning process built around a request for applications (RFA) feature.

The Mississippi State Department of Health would issue annually a request for applications (RFA) to meet projected bed need. Projected bed need determinations would be based on

- Nursing home use rates derived from the most recent statewide survey;
- Average regional (or county, if preferred) occupancy levels of 90% or greater over the preceding three years;
- The pending availability of licensed beds previously authorized but not yet open; and
- Compatibility of the projected bed need with state Medicaid program policy and budget considerations.

A public comment period would be incorporated in the process to permit interested and affected parties to comment on the projected bed need determination before it becomes final with publication of the request for applications.

The process should incorporate a feature that would permit interested parties to petition for publication of a request for applications to meet a special need that otherwise may not have been formally identified.

III

Acute Care Hospital Capacity

A. Context

A statewide glut of licensed acute care hospital beds complicates planning for community hospital services. There are far more hospital beds than needed. The average use of licensed beds has been less than 50% in recent years. With few exceptions, the surplus is statewide.[15] The continued presence of surplus hospital beds in all planning districts, and in nearly all counties with acute care hospitals, raises a number of basic planning questions:

- Does the "carrying cost" of maintaining unused beds raise operating costs unnecessarily?
- Do the surpluses, and any associated economic burden, retard the introduction of new and more cost effective practices and services?
- Do existing service providers maintain unwarranted surpluses to shield themselves from competition, as argued by some potential competitors?
- Should the space allocated to surplus beds be converted to other uses, particularly if doing so would avoid construction of new space, or facilities, to accommodate growing outpatient caseloads?
- Do the large surpluses mask need for additional services and capacity in some regions and reduce the sensitivity and responsiveness of planners and regulators to these legitimate community needs?
- Do the continuing surpluses, and the views of them by stakeholders and other interested parties, create an environment that invites policy intervention by legislators and other responsible parties?

These questions are unusually difficult to answer definitively. That they arise not infrequently suggests the importance of reducing excess capacity where it is possible to do so and is not likely to result in problematic consequences.

Given the widespread large licensed bed surplus, the 2006 AHPA report questioned the use (relevance) of a probability formula with a large constant (incorporating a high confidence factor) to estimate and project future acute care bed need. This formulation is more problematic when, as in the state plan, the formula is applied to individual hospitals

rather than the planning district or other defined planning region (e.g., documented primary service area).

A related policy questioned is the ability to "bank" unused acute care beds indefinitely. One of the recommendations in the 2006 report was to modify the existing provision of the CON program requiring regulatory approval for the reactivation of health services closed for 12 months or longer. The report recommended removing beds taken out of service for more than a year from the state licensure rolls, a policy followed in several other states.

These discussions called attention to the surplus and offered suggestions that might reduce it. A more systematic exploration of the question is presented below.

B. National Patterns and Trends

Hospital use has changed markedly over the last three decades. After rising rapidly following World War II, especially during the decade and a half after the introduction of Medicare and Medicaid, demand for inpatient care slowed and then began a long steady decline in the early 1980s. Although the rate, magnitude, and duration of the decrease varied by community, inpatient hospital use fell substantially in both relative and absolute terms for more than a decade and a half, between 1982 and 1997. In many communities, absolute demand—measured by the number of inpatient days of care provided—decreased by more than one-third. Inpatient use rates, e.g., admissions and patient days per 1,000 persons, decreased even more (Table 1).

In response to these changes, the hospital industry downsized steadily throughout the period. The number of nonfederal acute care community hospitals fell from 5,830 in 1980 to 4,936 in 2005, a 15% decrease. Inpatient bed capacity shrunk even more. The number of hospital beds decreased from 988,287 in 1980 to 802,311 in 2005, a 19% decline. These reductions occurred during a 25-year period of sustained population growth. Thus, the ratio of licensed acute care community hospital beds fell from 4.4 to 2.7 per 1,000 persons, a decrease of 39%.

Although a number of urban hospitals closed or were relocated during this period, in aggregate terms nearly all of the reduction in capacity occurred in the closure and consolidation of rural hospitals. Between 1980 and 2005, the number of urban hospitals decreased by about 1% whereas the number of rural hospitals fell by about 30%. The large majority of beds taken out of service during this period were from rural areas. It should be noted that the pattern of capacity reduction was not as geographically inequitable as may first appear. Most rural areas lost population during the period and population growth occurred largely in suburban areas surrounding urban centers. Nevertheless, the decrease in inpatient demand, the associated reduced viability of small rural hospitals, and the resultant closures and consolidations has been felt more intensely in rural areas than elsewhere. The effects in terms of reduced access to care in rural areas are enduring.

Table 1
U. S. Community Hospitals
Inpatient Service Trends
1970- 2005

	1970	1980	1985	1990	1995	2000	2005	Change 1980 to 2005
				Admissions				
Admissions	31,749,321	36,143,445	33,448,631	31,181,046	30,945,357	33,089,467	35,238,673	-2.5%
Absolute Change		4,394,124	-2,694,814	-2,267,585	-235,689	2,144,110	2,149,206	
Percent Change		13.8%	-7.5%	-6.8%	-0.8%	6.9%	6.5%	
				Admissons Rate (Admissions per 1,000 Population)				
Admissions Rate	145	160	141	125	118	118	119	-25.3%
Absolute Change		14.4	-18.9	-15.3	-7.5	-0.2	1.6	
Percent Change		9.9%	-11.8%	-10.9%	-6.0%	-0.2%	1.4%	
				Inpatient Days				
Inpatient Days	226,445,754	273,085,130	236,619,446	225,971,653	199,876,367	192,420,368	197,073,770	-27.8%
Absolute Change		46,639,376	-36,465,684	-10,647,793	-26,095,286	-7,455,999	4,653,402	
Percent Change		20.6%	-13.4%	-4.5%	-11.5%	-3.7%	2.4%	
				Inpatient Day Rate (Inpatient Days per 1,000 Population)				
Inpatient Day Rate	1,121.6	1,205.4	994.5	908.4	760.7	683.7	666.4	-44.7%
Absolute Change		83.8	-210.9	-86.1	-147.7	-77.0	-17.3	
Percent Change		7.5%	-17.5%	-8.7%	-16.3%	-10.1%	-2.5%	
				Average Length of Stay (Days)				
ALOS	7.8	7.6	7.1	7.2	6.5	5.8	5.6	-26.3%
Absolute Change		-0.2	-0.5	0.1	-0.7	-0.7	-0.2	
Percent Change		-2.6%	-6.6%	1.4%	-9.7%	-10.8%	-3.4%	

Source: American Hospital Association, *TrendWatch Chartbook 2006, Trends Affecting Hospitals & Health Systems,* April 2006; AHA Annual Survey data, 1980-2005; American Hospital Association, Health Forum, 2007; US Census Bureau, 2005 Population Estimates.

Demand has rebounded somewhat since 2000. Increases have not been uniform, modest in some states and substantial in others. Use rates now appear to be leveling off. Although there have been small annual variations, there has been no net change in the national hospital admission rate since 1999 (Table 2). The average length of hospital stays has continued to decrease modestly. The inpatient day use rate decreased nationally by between 5% and 6% from 1999 and 2000 (Table 3). Rates have been relatively stable in many communities for the last three years. Consequently, aggregate demand is now increasing at roughly the rate of population growth in most states and communities.

The decreases described above, and depicted in Table 1, occurred during a period of substantial population growth. The decrease in demand more than offset population growth, in all except the most rapidly growing communities. The reduction in the average length of hospital stays, the substitution of outpatient procedures and services for inpatient care, and the overall improvement in individual and community health made this possible.

The interaction of technological, economic, and managerial factors over more than two decades produced the shift to outpatient care and the reduction in hospital stays. Among the more important factors are:

- Technological advances in both diagnostic and therapeutic health services, especially imaging technologies, surgical techniques and practices, and pharmaceuticals.
- Altered economic incentives that derive from the shift from cost-based to prospective payment for care by Medicare and other major insurers.
- The shift to managed care and related administrative practices that focus on case management, less costly and least restrictive service settings, evidence-based practices and techniques, and alternatives to institutional care.

In combination, these changes have resulted in a reduction the numbers of many costly and risky procedures, the substitution of outpatient procedures and patient management for inpatient care, and in some cases more cost-effective use of health care resources. The net effect has been a substantial reduction in base hospital use rates, a reduction that incorporates a substantially shorter average length of hospital stay.

Most of these changes are either a one-time phenomenon or ongoing phenomena that are asymptotic. The shift from cost-based reimbursement to prospective payment and managed care is largely a one-time phenomena; the effect is enduring but not repeatable. The substitution of outpatient procedures and services for inpatient care is ongoing, occurring over a number of years, but is inherently asymptotic in nature.

Consequently, the longer these forces are in place, the greater the cumulative effect—the lower the natural or inherent level of inpatient demand—and the less prospective change they portend. Indications of where a state or community is on this spectrum of change include the percentage of the insured population covered by prospective payment and

managed care plans, the percentages of surgeries and related procedures (e.g., cardiac catheterization, interventional radiology) performed in licensed facilities (i.e., outside of physician offices) that are performed on outpatients, and the age-specific use rates for inpatient acute and long-term nursing care services.

The patterns and trends over the last three decades, though easily understood in hindsight, have produced numerous erroneous forecasts of future demand for inpatient care. Few predicted the extended decrease in demand between 1982 and 1997. Fewer still foresaw the trend reversal and the increased demand that became evident by 1997 or that the growth seen between 1999 and 2003 would be short lived. Failure to predict these patterns led to large inpatient bed surpluses nationwide during the decade between 1985 and 1995, bed shortages in many communities between 1999 and 2004, and the current uncertainty about aggregate demand and the likely inpatient share of that market.

The Health Care Advisory Board (HCAB), which provides market and trend advisory services to many hospital executives, has tried to make sense of these patterns and draw lessons for those trying to plan for future hospital service and capacity needs. In 2000, when it had become evident that the decade and half decline in inpatient demand had ended, HCAB concluded that we were "only at the beginning of an inpatient boom ahead."[16] This boom would be driven largely by increased demand from an aging and growing population. By 2007, the Board's view of future inpatient demand was (is) notably more restrained. Acknowledging the sharp increases in demand seen between 1999 and 2003 have receded, HCAB advised that it foresees

> No shortage of demand for high-end health care; recent reports of flatlining volumes are more an adjustment to unusually high growth rates in the early part of the decade [2000-2003] than the harbinger of sustained volume declines. For most hospitals, the inpatient business will still represent the lion's share of volumes—and profits—ten years hence; measured in dollars, facility investment will (and should) remain weighted toward the inpatient side.[17]

Over the next decade, HCAB projects a modest increase in aggregate inpatient demand of between 9% and 10%, a further modest reduction the average length of stay (about 4%), increased migration of surgery and other "procedure" patients to outpatient settings, and a continued increase in the percentage of inpatients that are medical admissions. This revised assessment of probable future demand appears more in line with underlying demographic, economic, and technological realities.

Aggregate demand for inpatient services nationally is not likely to change significantly over the next decade. There is likely to be only modest increases in inpatient demand in most communities, deriving largely from population growth and secondarily from population aging. The sharp increases in demand some predict as a result of the aging of the baby boom population are not likely to be as great as many assume. It is already evident that the substantial increase in inpatient use rates seen between 2000 and 2005 in

many states is not likely to be replicated soon. Demographic trends, technological changes, and evolving medical practice patterns indicate that sustained substantial increases in inpatient demand nationally are not likely until well after 2015, if then.

C. Mississippi Experience

Because of its distinctive demography and health service use patterns, demand for and use of hospital services in Mississippi has been consistently well above national norms. In 1982, for example, the average Mississippi hospital use rates were about 190 discharges and 1,500 inpatient days of care per 1,000 persons. This compares with national rates of less than 170 discharges and about 1,200 inpatient days of care per 1,000 persons. The Mississippi average length of hospital stays was roughly comparable to the national average of 7.3 days. Thus, in the early 1980s, just as the sustained decrease in use rates began, Mississippi's hospital use levels were substantially higher than the national averages.

Table 2
Acute Care Community Hospital Use
Mississippi and Peer/Comparative States
Admissions per 1,000 Persons, 1999 - 2005

Jurisdiction	Year							% Change
	1999	2000	2001	2002	2003	2004	2005	1999 -2005
United States	119	120	119	120	120	119	119	0
Mississippi	***150***	***153***	***153***	***145***	***144***	***147***	***142***	-5.33%
Alabama	153	153	153	151	157	158	155	1.31%
Arkansas	147	141	138	142	142	139	137	-6.80%
Georgia	106	111	108	104	107	106	105	-0.94%
Kentucky	144	148	146	147	146	146	148	2.78%
Louisiana	143	155	153	155	154	154	137	-4.20%
Maryland	111	115	113	116	117	119	122	9.91%
North Carolina	122	130	119	116	117	118	117	-4.10%
South Carolina	123	132	124	125	122	122	124	0.81%
Tennessee	137	133	131	138	139	140	139	1.46%
Virginia	105	106	103	102	103	103	103	-1.90%
West Virginia	160	162	165	163	163	164	161	0.63%

Source: American Hospital Association, Health Forum, 2006; AHA Annual Surveys, 1999 - 2005. Data are for acute care community hospitals. Federal hospitals, long term care hospitals, psychiatric hospitals, institutions for the mentally retarded, and alcoholism and other chemical dependency hospitals are not included.

Even though it has had comparatively high use rates over the last three decades, Mississippi too experienced a notable decrease in use rates and aggregate demand between the early 1980s and the late 1990s. Between 1982 and 2002 the Mississippi hospital admission rate decreased by more than 30%, from about 190 to 145 admissions per 1,000 persons. The average length of stay decreased to about 4.5 days, and the inpatient day rate decreased by about 35%, from nearly 1,500 days per 1,000 persons to

about 960 days per 1,000 persons. Mississippi hospital use rates continue to be substantially above national levels (Tables 2 and 3). There is little indication or prospect that this pattern will change soon.

Mississippi hospital development patterns have incorporated, and reflected, these comparatively high use rates. The Mississippi acute care general hospital bed-to-population ratio remains one of the highest in the nation, substantially higher than the bed-to-population ratios of neighboring and peer states (Table 4). Notably, although the Mississippi ratio decreased by more than 8% percent between 1999 and 2005, the rate of decrease was lower than the national average, and substantially lower than the decrease in many neighboring and peer states, where the reduction in unneeded capacity continued.

Table 3
Acute Care Community Hospital Use
Mississippi and Peer/Comparative States
Inpatient Days per 1,000 Persons, 1999 - 2005

Jurisdiction	Year							% Change 1999 - 2005
	1999	2000	2001	2002	2003	2004	2005	
United States	704	682	681	683	676	673	665	-5.54%
Mississippi	***1,053***	***1,028***	***1,047***	***958***	***935***	***955***	***921***	***-12.54%***
Alabama	825	806	799	724	788	810	798	-3.27%
Arkansas	861	781	756	780	766	746	722	-16.14%
Georgia	722	666	653	676	694	683	678	-6.09%
Kentucky	832	823	815	830	824	817	811	-2.52%
Louisiana	794	799	837	865	862	856	755	-4.91%
Maryland	585	564	554	560	575	573	570	-2.56%
North Carolina	749	725	727	714	719	716	702	-6.28%
South Carolina	725	725	724	710	711	696	725	0.00%
Tennessee	784	741	717	773	776	793	801	2.17%
Virginia	601	586	589	587	593	597	595	-1.00%
West Virginia	992	981	1,003	984	977	942	916	-7.66%

Source: American Hospital Association, Health Forum, 2006; AHA Annual Surveys, 1999 - 2005. Data are for acute care community hospitals. Federal hospitals, long term care hospitals, psychiatric hospitals, institutions for the mentally retarded, and alcoholism and other chemical dependency hospitals are not included.

Given Mississippi demography, the relatively slow population growth rate, and the historically high inpatient use rates, there is little indication of a substantial increase in inpatient demand over the next decade. There is little prospect that the current bed surplus will be eliminated, or even noticeably reduced, by increased demand or other market forces. Sufficiently detailed patient data are not available to permit construction of an informed projection, but the data that are available indicate that there is the distinct possibility that inpatient demand may decrease further in many areas of the state over the next decade. Mississippi use levels and patterns are likely to move in the direction of neighboring and peer state experience.

Trends in acute care hospital service delivery, the array and distribution of hospital services, and the amount of acute care hospital capacity in place, suggest that acute care

hospital services planning and development over the next decade is likely to focus on infrastructure renovation and modernization rather than on bed capacity. If acute care hospitals are to remain competitive with freestanding outpatient surgery and other diagnostic and treatment centers, and responsive to community needs, they are likely to need to convert or add space to accommodate expanded outpatient services and to acquire state-of-the-art technology and equipment.

Table 4
Acute Care Community Hospital Capacity
Mississippi and Peer/Comparative States
Beds per 1,000 Persons, 1999 - 2005

Jurisdiction	Year							% Change
	1999	2000	2001	2002	2003	2004	2005	1999 -2005
United States	3.0	2.9	2.9	2.8	2.8	2.8	2.7	-10.00%
Mississippi	***4.8***	***4.8***	***4.8***	***4.6***	***4.5***	***4.5***	***4.4***	-8.33%
Alabama	3.7	3.7	3.7	3.6	3.5	3.4	3.4	-8.11%
Arkansas	3.9	3.7	3.5	3.7	3.6	3.5	3.4	-12.82%
Georgia	3.2	2.9	2.9	2.9	2.8	2.8	2.7	-15.63%
Kentucky	3.8	3.7	3.7	3.7	3.6	3.7	3.6	-5.26%
Louisiana	3.8	3.9	4.0	4.0	4.0	3.8	3.4	-10.53%
Maryland	2.2	2.1	2.1	2.1	2.1	2.1	2.0	-9.09%
North Carolina	3.1	2.9	2.9	2.8	2.8	2.8	2.7	-12.90%
South Carolina	3.0	2.9	2.8	2.7	2.7	2.7	2.7	-10.00%
Tennessee	3.8	3.6	3.6	3.5	3.5	3.5	3.5	-7.89%
Virginia	2.5	2.4	2.3	2.4	2.3	2.3	2.3	-8.00%
West Virginia	4.5	4.4	4.4	4.3	4.3	4.1	4.0	-11.11%

Source: American Hospital Association, Health Forum, 2006; AHA Annual Surveys, 1999 - 2005. Data are for acute care community hospitals. Federal hospitals, long term care hospitals, psychiatric hospitals, institutions for the mentally retarded, and alcoholism and other chemical dependency hospitals are not included.

A major planning and development issue facing Mississippi's general acute care hospitals is the ongoing shift of large numbers of patients from inpatient to outpatient settings. The viability of Mississippi's essential community hospitals is threatened by this shift, especially the movement of profitable outpatient services, e.g., diagnostic imaging, outpatient surgery, cardiac catheterization and radiation therapy, to competing freestanding diagnostic and treatment centers. With operating margins low, and in some cases negative, and a pressing need for capital to modernize and meet growing community expectations, the economic well-being of these facilities is likely to depend, to a substantial degree, on their ability to retain a high percentage of the rapidly growing, and more profitable, outpatient diagnostic and treatment markets.

Currently, there is not sufficient data publicly available to permit accurate measurement of the erosion of community hospital outpatient surgery and diagnostic and treatment services markets. Data that are available suggest, but do not prove, that the problem is

substantial and increasing in magnitude. This phenomenon warrants scrutiny and should be followed closely.

Hospital inpatient service development over the next decade and beyond is likely to focus on facility renovation and modernization. Rationalization of licensed acute care bed capacity is needed to facilitate this orientation.. The surplus licensed bed overhang necessarily creates uncertainty as to how the excess capacity may be used and what the effects of that use might be on other service providers. Without a reliable (and generally accepted) forecast to future bed needs, and reasonable expectations of where that capacity is likely to be located and how it may be used, there is substantial unwarranted risk in determining how much space, and how many beds, should be renovated, modernized, or replaced. Reduction of this uncertainty should permit service developers to limit capital investment in inpatient service development to what is essential and to focus on improving outpatient and emergency service offerings.

Eliminating or greatly reducing surplus acute care capacity will not transform hospital operations and performance. All of the underlying problems will remain, it should remove some operational uncertainty, promote system stability, make community and regional planning more effective, and make investment decisions less risky.

D. Alternatives to Reduce Surplus Capacity

Widespread surplus capacity complicates planning for inpatient acute care services. The related questions of how to permit development of additional capacity that might be justified in high growth areas and avoid increasing the regional and state surplus are not easily resolved. Given the widespread surpluses, tentative suggestions of realigning the acute care planning regions to "carve out" distinct geographic regions that might quality for additional capacity under existing planning rules are not practical. Such action would raise as many planning questions as it would be likely to solve. Similarly, the acute care bed need formula now used to project demand for inpatient beds is largely moot in that there are large bed surpluses in almost all locations and circumstances where it might be applied.

These circumstances, and the difficulties most community hospitals face, are well known. They are acknowledged and summarized in the current state health plan.[18] Surveys and interviews with key stakeholders in 2006 found that there is broad recognition that elimination, or at least the substantial reduction, of the enduring acute care bed surplus would be beneficial if it could be done by means that were perceived to be fair and equitable, in a way that did not favor any specific party, group, organization, or facility.

1. Facility and Service Consolidation

From a disinterested system perspective, and setting aside convenience and geographic access considerations, the most cost effective approach to a reduction of the surplus would be to consolidate underused services and facilities. This should permit greater economies of scale and more efficient operations. Some facilities would be closed; others

merged. It is arguable that this approach, pursued aggressively, might have noticeably positive cost and quality effects.

Mississippi has 97 acute care community hospitals, 28 of which are critical access hospitals with 25 beds or fewer. These facilities are distributed among 74 counties; eight counties do not have a hospital within their boundaries. Only 14 of the state's 82 counties have more than one acute care hospital. These counties have 37 of the state's 97 facilities. Seventeen hospitals are located in the four counties (Hinds, Harrison, Lauderdale, Rankin) with three or more facilities. Assuming that critical access hospitals and facilities in other counties with only one hospital would not be deemed appropriate for closure, the pool of potential candidates for consolidation is comparatively small.

Comprehensive patient level discharge data would permit informed assessments of the likely effects of specific closures and mergers. Without these data it is not possible to develop models to assess the relative value of alternative service and facility closures and mergers. The limited data that are available suggest that consolidation will play a relatively modest role in the reduction of excess capacity. Large numbers of hospital closures would necessarily disproportionately burden rural communities.

Consolidation should be pursued where circumstances and market conditions are favorable. In some cases the benefits could be substantial and enduring. It is evident, however, that consolidation alone will not make a major contribution to reducing surplus capacity. A more systematic approach appears to be necessary.

2. Bed Need Formula Modification

The current acute care bed planning methodology calls for applying the formula shown below. It contains two variables: the previous year average daily inpatient census of the hospital or the planning region involved and the constant (confidence factor) used to estimate the probability that an unused hospital bed will be available on given day.

$$\textbf{Beds Needed} = \textbf{ADC} + \textbf{K}\sqrt{ADC}$$

Where: ADC = Average Daily Census
K = Confidence Factor of 2.57

In this instance, the constant (confidence factor) value (2.57) applied equates to an average daily census distribution within about three standard deviations of the average census. This indicates that it is highly likely (more than 99% probability) that the hospital (or the planning region to which the formula may be applied) will have an empty hospital bed on any given day during the year.[19]

Lower value constants [e.g., 1.28 = 90% confidence level; 1.65 = 95% confidence level; 1.96 = 97.5% confidence; 2.33 = 99% confidence level) give different confidence levels that a bed will be available on a given day (Table 5). Application of smaller constants (lower confidence values) produced correspondingly lower projected bed need. Where demand and capacity are reasonably in balance, these formulae have utility. Under these

circumstances, selecting a high (or low) constant amounts to balancing capacity (and the related capital investment/development costs) against convenience and immediate access to a hospital bed. Where there is substantial surplus, the choice of a high or low constant has little, if any, material meaning. The formula loses power and relevance under large and continuing capacity surpluses.

Reducing the confidence factor under current circumstances would not have meaningful effect, and could prove counterproductive in selected circumstances. It would lower the bed need estimate where applied, but the circumstance where this might be meaningful would be in those few locations where all licensed beds are in service, occupancy is high, and demand is growing. In these selected circumstances, applied to a small geographic area, the higher constant has utility, permitting the addition of needed capacity sooner than would a smaller constant (lower confidence factor).

Table 5
Relative Bed Need Estimates
by Confidence Level Constants

Confidence Level	*Constant (K) **	*Average Daily Census*	$\sqrt{ADC}$	$K\sqrt{ADC}$	*Beds Permited* $ADC + K\sqrt{ADC}$
>99%	2.576	100	10	25.8	126
99.0%	2.326	100	10	23.3	123
97.5%	1.960	100	10	19.6	120
95.0%	1.645	100	10	16.5	116
90.0%	1.282	100	10	12.8	113
80.0%	0.842	100	10	8.4	108

* "t" statistic, Table A 4, Jean Dunn, *Basic Statistics: A Primer for the Biomedical Sciences* , 1964, p. 169.

Criticism of the acute care bed need formula is that it has little, if any, utility under conditions of sustained surplus, not that it is inherently inferior to other formulaic methodologies. Most states have abandoned probability formulas because hospital admissions typically are not random and can be managed within certain limits. Moreover, where the requisite patient level hospital use data are available, analysis of facility, service, and geographic use levels and patterns have greater utility in both facility and regional planning.

3. Calibrated Bed Need Determination and Licensure

Unneeded acute care capacity has been reduced in most states largely through voluntary action, often through consolidation and the conversion of excess bed space to other uses. The principal other uses include conversion to nursing home licensure, provision of extended care, and to a variety of outpatient services. Substantial reductions also have come through the formal elimination of "paper beds," acute care beds that hospitals were

licensed to operate but were not actually placed in service. In many states, beds that were not placed in service for a year or more were removed systematically from licensure rolls.

Where formal action may be necessary, or desirable, to reduce access capacity, the most equitable and flexible approach is an easily understood and applied formula that determines the number of beds that may be licensed for use during a specified licensure period, usually one year. The number of licensed beds permitted is a function of the average daily census reported for the previous licensure period, usually the previous calendar or fiscal year, inflated by an operating efficiency factor.

This method was adopted by the State of Maryland several years ago and has been used successfully since. The key provision of the Maryland methodology reads:

> "Methodology for Calculating Total Authorized Licensed Bed Capacity**.**
>
> (1) The average daily census for each general hospital shall be obtained from the most current Health Services Cost Review Commission inpatient utilization data for a 12-month period.
>
> (2) The calculation of average daily census shall include the utilization of inpatient medical-surgical, gynecology, obstetric, pediatric, and acute psychiatric service beds. Newborn services are excluded from the calculation of average daily census.
>
> (3) The total licensed bed capacity for each general hospital shall equal 140 percent of the calculated average daily census for all inpatient acute care hospital services."[20]

The 140% operating efficiency factor used in Maryland equates to an implied facility annual occupancy level of about 71%. It is applied annually. The Maryland hospital bed need determination and licensure language is reproduced in Attachment I, Appendix B.

There are a number of advantages, and few drawbacks, to using this method, or a variation of it, to determine licensed operating capacity. The principal advantages include

- It is easily understood and applied.
- It is in most respects equitable. Applied equally to all affected parties, surpluses would be reduced proportional to the surplus in each facility;
- Though formulaic, it is responsive to changing circumstances at individual facilities.
- The general approach can be tailored to specific state needs. Should policy considerations warrant, different operating efficiency factors could be applied geographically (urban-suburban vs. rural), by hospital size (e.g., exclude hospital below a given size), or hospital category (e.g., exclude critical access hospitals).
- The method can be used in conjunction with other policy considerations.

- Even as it reduces excess capacity generally, it permits capacity increases in circumstances where there is specific institutional need.

The methodology appears well suited to the circumstances that exist in Mississippi. Tables 6 and 7 illustrate the effects of alternate applications of the methodology in Mississippi. The first, Table 6, shows the results of applying a range of efficiency factors—180% to 130% to the 2006 average daily census—to each Mississippi acute care hospital. Table 7 illustrates how the methodology could work if it were applied incrementally over three or four years. In order to model the sequence of annual effects that would flow from a multi year incremental implementation of the method, 2003 was chosen as the year to begin. A high efficiency factor (180%, or an implied 56% occupancy standard) was chosen for the initial year to permit a gradual decrease in licensed capacity over four years.

Incremental implementation of the methodology could be of substantial near term (next 5 years) benefit in Mississippi. It would, among other things,

- Establish a definitive policy and mechanism to reduce systematically the large statewide bed surplus;
- Provide those affected, and the market generally, sufficient time to make any institutional changes or adjustments thought to be necessary;
- Create an interval and an incentive, to develop a patient level data system that would make it possible to better define regional and local medical markets and trade patterns; and
- Facilitate a planned gradual return to more effective planning for acute care hospital beds as the surplus is reduced.

There are distinctive demographic and health system characteristics in Mississippi that warrant consideration of variations on the methodology implemented in Maryland. The unusually large number of small and critical access hospitals and the large rural areas and populations suggest that consideration be given to exempting critical access hospitals and/or setting different efficiency factors for rural and urban/suburban areas.

E. Conclusions and Findings

Hospital use has changed markedly over the last three decades. After rising rapidly for several decades, demand for inpatient care decreased steadily between 1982 and 1997. In response to these changes, the hospital industry downsized throughout the period

Over the last decade, demand for inpatient care appears to have stabilized at a substantially lower use rates. Aggregate demand for inpatient services nationally is likely to grow modestly over the next decade. Demographic trends, technological changes, and evolving medical practice patterns indicate that substantial increases in inpatient demand nationally are not likely nationally until well after 2015.

Table 6
Mississippi Hospitals, 2006
Capacity, Use, Alternative Bed Need Estimates

Hospital	Licensed Beds	Averge Daily Census	Percent Occu-pancy	Beds Needed: Current Formula	Bed: ADC Ratio	Licensed Beds Permitted @ Specified Bed to Average Daily Census Ratios							
						180% of ADC		160% of ADC		140% of ADC		130% of ADC	
						Beds	Diff.	Beds	Diff.	Beds	Diff.	Beds	Diff.
General Hospital Service Area 1													
MAGNOLIA REGIONAL HEALTH CENTER	145	74.7	51.5	97	1.9	134	-11	119	-26	105	-40	97	-48
CALHOUN HEALTH SERVICES	30	9.8	32.7	18	3.1	18	-12	16	-14	14	-16	13	-17
TRACE REGIONAL HOSPITAL	84	14.3	17.0	24	5.9	26	-58	23	-61	20	-64	19	-65
CHOCTAW COUNTY MEDICAL CENTER	25	4.9	19.8	11	5.1	9	-16	8	-17	7	-18	6	-19
NMMC WEST POINT	60	29.7	49.4	44	2.0	53	-7	47	-13	42	-18	39	-21
GRENADA LAKE MEDICAL CENTER	156	62.7	40.2	83	2.5	113	-43	100	-56	88	-68	82	-74
BAPTIST MEMORIAL HOSP NORTH MS	204	117.8	57.8	146	1.7	212	8	189	-15	165	-39	153	-51
NORTH MISS MEDICAL CENTER	554	336.0	60.7	383	1.6	605	51	538	-16	470	-84	437	-117
BAPTIST MEMORIAL HOSP GOLDEN TRIANGLE	285	110.5	38.8	137	2.6	199	-86	177	-108	155	-130	144	-141
ALLIANCE HEALTHCARE SYSTEM	40	12.3	30.8	21	3.2	22	-18	20	-20	17	-23	16	-24
GILMORE MEM REG MEDICAL CENTER	95	35.3	37.2	51	2.7	64	-31	56	-39	49	-46	46	-49
PIONEER COMMUNITY HOSPITAL OF ABERDEEN	35	7.5	21.4	15	4.7	13	-22	12	-23	10	-25	10	-25
NOXUBEE GENERAL CRITICAL ACCESS HOSPITAL	25	5.0	20.1	11	5.0	9	-16	8	-17	7	-18	7	-18
OKTIBBEHA COUNTY HOSPITAL	96	33.9	35.4	49	2.8	61	-35	54	-42	48	-48	44	-52
TRI-LAKES MEDICAL CENTER	64	56.2	87.8	75	1.1	101	37	90	26	79	15	73	9
PONTOTOC HEALTH SERVICES	25	7.6	26.1	15	3.3	14	-11	12	-13	11	-14	10	-15
BAPTIST MEMORIAL HOSP BOONEVILLE	114	25.1	22.1	38	4.5	45	-69	40	-74	35	-79	33	-81
NORTH OAK REGIONAL MEDICAL CENTER	76	19.6	25.9	31	3.9	35	-41	31	-45	27	-49	26	-50
TIPPAH COUNTY HOSPITAL	45	10.9	24.3	19	4.1	20	-25	17	-28	15	-30	14	-31
IUKA HOSPITAL	48	16.8	34.9	27	2.9	30	-18	27	-21	23	-25	22	-26
BAPTIST MEMORIAL HOSP UNION COUNTY	153	45.8	29.9	63	3.3	82	-71	73	-80	64	-89	60	-93
WEBSTER HEALTH SERVICES	38	23.3	61.3	36	1.6	42	4	37	-1	33	-5	30	-8
WINSTON MEDICAL CENTER	65	11.6	17.9	20	5.6	21	-44	19	-46	16	-49	15	-50
YALOBUSHA GENERAL HOSPITAL	26	9.0	34.5	17	2.9	16	-10	14	-12	13	-13	12	-14
GHSA 1 Totals	***2,488***	***1,080.5***	***0.412***	***1,430***	***2.3***	***1,945***	***-543***	***1,729***	***-759***	***1,513***	***-975***	***1,405***	***-1,083***
General Hospital Service Area 2													
BOLIVAR MEDICAL CENTER	165	65.3	39.6	86	2.5	118	-47	104	-61	91	-74	85	-80
NORTHWEST MS REGIONAL MEDICAL CENTER	181	79.3	43.8	102	2.3	143	-38	127	-54	111	-70	103	-78
BAPTIST MEMORIAL HOSP DESOTO	179	153.4	85.8	185	1.2	276	97	245	66	215	36	199	20
UNIVERSITY HOSP & CLINICS HOLMES COUNTY	35	13.9	39.8	24	2.5	25	-10	22	-13	20	-15	18	-17
HUMPHREYS COUNTY MEMORIAL HOSPITAL	34	7.4	21.8	14	4.6	13	-21	12	-22	10	-24	10	-24
GREENWOOD LEFLORE HOSPITAL	188	112.0	59.6	139	1.7	202	14	179	-9	157	-31	146	-42
KILMICHAEL HOSPITAL	19	6.5	34.0	13	2.9	12	-7	10	-9	9	-10	8	-11
TYLER HOLMES MEMORIAL HOSPITAL	25	7.2	28.9	14	3.5	13	-12	12	-13	10	-15	9	-16
QUITMAN COUNTY HOSPITAL	33	11.9	36.2	21	2.8	21	-12	19	-14	17	-16	16	-17
NORTH SUNFLOWER MEDICAL CENTER	35	11.7	33.3	20	3.0	21	-14	19	-16	16	-19	15	-20
SOUTH SUNFLOWER COUNTY HOSPITAL	49	16.7	34.1	27	2.9	30	-19	27	-22	23	-26	22	-27
TALLAHATCHIE GENERAL HOSPITAL	9	2.6	29.3	7	3.4	5	-4	4	-5	4	-5	3	-6
DELTA REGIONAL MEDICAL CENTER	221	120.1	54.4	148	1.8	216	-5	192	-29	168	-53	156	-65
DELTA REG MED CTR WEST CAMPUS	97					0	-97	0	-97	0	-97	0	-97
GHSA 2 Totals	***1,270***	***608.1***	***0.478***	***801***	***2.1***	***1,095***	***-175***	***973***	***-297***	***851***	***-419***	***791***	***-479***

Table 6
Mississippi Hospitals, 2006
Capacity, Use, Alternative Bed Need Estimates

Hospital	Licensed Beds	Averge Daily Census	Percent Occu-pancy	Beds Needed: Current	Bed: ADC Ratio	Licensed Beds Permitted @ Specified Bed to Average Daily Census Ratios							
						180% of ADC		160% of ADC		140% of ADC		130% of ADC	
						Beds	Diff.	Beds	Diff.	Beds	Diff.	Beds	Diff.
General Hospital Service Area 3													
MONTFORT JONES MEMORIAL HOSPITAL	71	27.1	38.2	41	2.6	49	-22	43	-28	38	-33	35	-36
CLAIBORNE COUNTY HOSPITAL	32	7.3	22.9	14	4.4	13	-19	12	-20	10	-22	10	-22
HARDY WILSON MEMORIAL HOSPITAL	35	19.7	56.4	31	1.8	36	1	32	-3	28	-7	26	-9
CENTRAL MISS MEDICAL CENTER	400	138.5	34.6	169	2.9	249	-151	222	-178	194	-206	180	-220
MISS BAPTIST MEDICAL CENTER	541	294.9	54.5	339	1.8	531	-10	472	-69	413	-128	383	-158
MISS METHODIST REHAB CENTER	44	0.9	2.1	3	47.8	2	-42	1	-43	1	-43	1	-43
ST DOMINIC JACKSON MEMORIAL HOSPITAL	453	258.8	57.1	300	1.8	466	13	414	-39	362	-91	336	-117
UNIVERSITY HOSP & CLINICS	664	403.8	60.8	455	1.6	727	63	646	-18	565	-99	525	-139
JEFFERSON DAVIS COMMUNITY HOSPITAL	35	9.0	25.8	17	3.9	16	-19	14	-21	13	-22	12	-23
LAWRENCE COUNTY HOSPITAL	25	6.2	24.7	13	4.0	11	-14	10	-15	9	-16	8	-17
LEAKE MEMORIAL HOSPITAL	25	5.5	22.0	12	4.6	10	-15	9	-16	8	-17	7	-18
KINGS DAUGHTERS MEDICAL CENTER	122	39.7	32.2	56	3.1	71	-51	64	-58	56	-66	52	-70
MADISON COUNTY MEDICAL CENTER	67	16.3	24.3	27	4.1	29	-38	26	-41	23	-44	21	-46
RANKIN MEDICAL CENTER	134	62.7	46.8	83	2.1	113	-21	100	-34	88	-46	81	-53
RIVER OAKS HOSPITAL	110	82.5	75.0	106	1.3	149	39	132	22	116	6	107	-3
WHITFIELD MED/SURG HOSPITAL	32	8.0	25.0	15	4.0	14	-18	13	-19	11	-21	10	-22
WOMANS HOSPITAL AT RIVER OAKS	111	24.2	21.8	37	4.6	43	-68	39	-72	34	-77	31	-80
S E LACKEY MEMORIAL CRITICAL ACCESS HOSP	35	4.5	40.8	10	7.8	8	-27	7	-28	6	-29	6	-29
SCOTT REGIONAL HOSPITAL	30	16.8	56.0	27	1.8	30	0	27	-3	24	-6	22	-8
SHARKEY ISSAQUENA COMMUNITY HOSPITAL	29	7.0	24.2	14	4.1	13	-16	11	-18	10	-19	9	-20
MAGEE GENERAL HOSPITAL	64	28.8	45.0	43	2.2	52	-12	46	-18	40	-24	37	-27
SIMPSON GENERAL HOSPIAL	35	12.5	35.8	22	2.8	23	-12	20	-15	18	-17	16	-19
RIVER REGION HEALTH SYSTEM	236	136.7	57.9	167	1.7	246	10	219	-17	191	-45	178	-58
KINGS DAUGHTERS HOSPITAL OF YAZOO CO	35	11.9	45.5	21	2.9	21	-14	19	-16	17	-18	15	-20
GHSA 3 Totals	***3,365***	***1,623.4***	***0.485***	***2,020***	***2.1***	***2,922***	***-443***	***2,597***	***-768***	***2,273***	***-1,092***	***2,110***	***-1,255***
General Hospital Service Area 4													
H.C. WATKINS MEMORIAL HOSPITAL	25	6.2	24.9	13	4.0	11	-14	10	-15	9	-16	8	-17
ALLIANCE HEALTH CENTER	68	14.3	21.0	24	4.8	26	-42	23	-45	20	-48	19	-49
JEFF ANDERSON REGIONAL MEDICAL CENTER	260	146.1	56.2	177	1.8	263	3	234	-26	205	-55	190	-70
RILEY HOSPITAL	120	39.0	32.5	55	3.1	70	-50	62	-58	55	-65	51	-69
RUSH FOUNDATION HOSPITAL	215	93.4	43.4	118	2.3	168	-47	149	-66	131	-84	121	-94
NESHOBA COUNTY GENERAL HOSPITAL	82	25.0	30.5	38	3.3	45	-37	40	-42	35	-47	32	-50
LAIRD HOSPITAL	25	9.8	39.2	18	2.5	18	-7	16	-9	14	-11	13	-12
NEWTON REGIONAL HOSPITAL	30	12.7	42.3	22	2.4	23	-7	20	-10	18	-12	17	-13
GHSA 4 Totals	***825***	***346.5***	***0.422***	***465***	***2.4***	***624***	***-201***	***554***	***-271***	***485***	***-340***	***450***	***-375***
General Hospital Service Area 5													
NATCHEZ COMMUNITY HOSPITAL	101	45.3	44.8	63	2.2	81	-20	72	-29	63	-38	59	-42
NATCHEZ REGIONAL MEDICAL CENTER	159	56.4	35.5	76	2.8	102	-57	90	-69	79	-80	73	-86
FRANKLIN COUNTY MEMORIAL HOSPITAL	36	14.8	41.2	25	2.4	27	-9	24	-12	21	-15	19	-17
JEFFERSON COUNTY HOSPITAL	30	20.4	68.0	32	1.5	37	7	33	3	29	-1	27	-3
BEACHAM MEMORIAL HOSPITAL	37	18.6	50.2	30	2.0	33	-4	30	-7	26	-11	24	-13
SOUTHWEST MISS REGIONAL MEDICAL CENTER	150	104.9	70.0	131	1.4	189	39	168	18	147	-3	136	-14
WALTHALL COUNTY GENERAL HOSPITAL	35	15.2	43.6	25	2.3	27	-8	24	-11	21	-14	20	-15
FIELD MEMORIAL COMMUNITY HOSPITAL	25	7.6	30.5	15	3.3	14	-11	12	-13	11	-14	10	-15
GHSA 5 Totals	***573***	***283.3***	***0.475***	***396***	***2.0***	***510***	***-63***	***453***	***-120***	***397***	***-176***	***368***	***-205***

Table 6
Mississippi Hospitals, 2006
Capacity, Use, Alternative Bed Need Estimates

Hospital	Licensed Beds	Averge Daily Census	Percent Occu-pancy	Beds Needed: Current	Bed: ADC Ratio	Licensed Beds Permitted @ Specified Bed to Average Daily Census Ratios: 180% of ADC Beds	180% of ADC Diff.	160% of ADC Beds	160% of ADC Diff.	140% of ADC Beds	140% of ADC Diff.	130% of ADC Beds	130% of ADC Diff.
General Hospital Service Area 6													
COVINGTON COUNTY HOSPITAL	35	14.7	42.0	25	2.4	26	-9	24	-11	21	-14	19	-16
FORREST GENERAL HOSPITAL	400	261.2	65.3	303	1.5	470	70	418	18	366	-34	340	-60
GREENE COUNTY HOSPITAL	3	0.4	12.2	2	8.1	1	-2	1	-2	1	-2	0	-3
JASPER GENERAL HOSPITAL	16	0.9	5.8	3	17.2	2	-14	1	-15	1	-15	1	-15
SOUTH CENTRAL REGIONAL MEDICAL CENTER	275	151.3	55.0	183	1.8	272	-3	242	-33	212	-63	197	-78
WESLEY MEDICAL CENTER	211	138.4	65.6	169	1.5	249	38	221	10	194	-17	180	-31
MARION GENERAL HOSPITAL	79	29.9	37.8	44	2.6	54	-25	48	-31	42	-37	39	-40
PERRY COUNTY GENERAL HOSPITAL	30	9.3	31.0	17	3.2	17	-13	15	-15	13	-17	12	-18
WAYNE GENERAL HOSPITAL	80	33.6	42.0	48	2.4	60	-20	54	-26	47	-33	44	-36
GHSA 6 Totals	***1,129***	***639.7***	***0.564***	***794***	***1.8***	***1,151***	***22***	***1,024***	***-105***	***896***	***-233***	***832***	***-297***
General Hospital Service Area 7													
GEORGE COUNTY HOSPITAL	53	24.4	46.0	37	2.2	44	-9	39	-14	34	-19	32	-21
HANCOCK MEDICAL CENTER	25	14.6	58.5	24	1.7	26	1	23	-2	20	-5	19	-6
BILOXI REGIONAL MEDICAL CENTER	153	88.5	57.9	113	1.7	159	6	142	-11	124	-29	115	-38
GARDEN PARK MEDICAL CENTER	130	51.4	39.5	70	2.5	93	-37	82	-48	72	-58	67	-63
GULF COAST MEDICAL CENTER	144	16.6	11.5	27	8.7	30	-114	26	-118	23	-121	22	-122
MEMORIAL HOSPITAL AT GULFPORT	303	205.5	67.8	242	1.5	370	67	329	26	288	-15	267	-36
OCEAN SPRINGS HOSPITAL	136	96.5	70.9	122	1.4	174	38	154	18	135	-1	125	-11
SINGING RIVER HOSPITAL	385	98.5	25.6	124	3.9	177	-208	158	-227	138	-247	128	-257
HIGHLAND COMMUNITY HOSPITAL	95	18.4	19.4	29	5.2	33	-62	30	-65	26	-69	24	-71
PEARL RIVER COUNTY HOSPITAL	24	1.6	6.6	5	15.1	3	-21	3	-21	2	-22	2	-22
STONE COUNTY HOSPITAL	25	5.5	22.0	12	4.5	10	-15	9	-16	8	-17	7	-18
GHSA 7 Totals	***2,540***	***621.5***	***0.243***	***801***	***4.1***	***1,119***	***-354***	***994***	***-479***	***870***	***-603***	***808***	***-665***
State Totals	***11,123***	***5,203.0***	***0.462***	***6,711***	***2.1***	***9,365***	***-1,758***	***8,325***	***-2,798***	***7,284***	***-3,839***	***6,764***	***-4,359***

Source: Data, Mississippi State Department of Health, Division of Licensure and Certification, 2006; Calculations AHPA, 2007.

Table 7
Mississippi Hospitals
Capacity and Use, 2003
Projected Bed Need Based on Decreasing Bed to ADC Ratios, 2004 - 2007

	Baseline Year, 2003					Licensed Beds: ADC Ratios, 2004 - 2007						
Hospital	*Licensed Beds*	*Averge Daily Census*	*Percent Occu-pancy*	*Beds Needed: Current Formula*	*Bed: ADC Ratio*	*Beds Licensed @ 180% of ADC (2004)*	*Hospital ADC (2004)*	*Beds Licensed @ 160% of ADC (2005)*	*Hospital ADC (2005)*	*Beds Licensed @ 140% of ADC (2006)*	*Hospital ADC (2006)*	*Beds Licensed @ 130% of ADC (2007)*
General Hospital Service Area 1												
MAGNOLIA REGIONAL HEALTH CENTER	145	76.3	52.6%	99	1.9	137	70.4	113	73.2	102	74.7	97
CALHOUN HEALTH SERVICES	30	8.0	26.5%	15	3.8	14	10.0	16	9.5	13	9.8	13
TRACE REGIONAL HOSPITAL	84	15.7	18.7%	26	5.3	28	14.3	23	14.9	21	14.3	19
CHOCTAW COUNTY MEDICAL CENTER	15	2.9	19.4%	7	5.2	5	4.5	7	4.6	6	4.9	6
NORTH MISS MED CTR WEST POINT	60	37.2	61.9%	53	1.6	67	35.7	57	31.4	44	29.7	39
GRENADA LAKE MEDICAL CENTER	156	76.0	48.7%	98	2.1	137	70.0	112	52.7	74	62.7	82
BAPTIST MEMORIAL HOSPITAL NORTH MISS	204	132.9	65.1%	162	1.5	239	119.5	191	119.1	167	117.8	153
NORTH MISS MEDICAL CENTER	554	360.9	65.1%	410	1.5	650	365.8	585	347.2	486	336.0	437
BAPTIST MEMORIAL HOSPITAL GOLDEN TRIANGLE	285	117.3	41.2%	145	2.4	211	112.1	179	114.4	160	110.5	144
ALLIANCE HEALTHCARE SYSTEM	40	11.8	29.6%	21	3.4	21	14.3	23	13.4	19	12.3	16
GILMORE MEMORIAL	95	50.6	53.3%	69	1.9	91	50.7	81	35.7	50	35.3	46
PIONEER COMMUNITY HOSPITAL OF ABERDEEN	25	2.4	9.6%	6	10.4	4	1.9	3	10.5	15	7.5	10
NOXUBEE GENERAL CRITICAL ACCESS HOSPITAL	25	5.2	20.7%	11	4.8	9	4.7	8	4.4	6	5.0	7
OKTIBBEHA COUNTY HOSPITAL	96	34.7	36.1%	50	2.8	62	34.1	55	33.1	46	33.9	44
TRI-LAKES MEDICAL CENTER*	70	25.1	35.9%	38	2.8	45	27.8	44	35.0	49	56.2	73
PONTOTOC CRITICAL ACCESS HOSPITAL	25	3.2	13.0%	8	7.7	6	6.4	10	9.9	14	7.6	10
BAPTIST MEMORIAL HOSPITAL BOONEVILLE	114	25.2	22.1%	38	4.5	45	23.4	37	24.8	35	25.1	33
NORTH OAK REGIONAL MEDICAL CENTER	76	16.5	21.7%	27	4.6	30	15.4	25	16.4	23	19.6	26
TIPPAH COUNTY HOSPITAL	70	12.1	17.2%	21	5.8	22	12.7	20	11.9	17	10.9	14
NORTH MISS MED CTR IUKA	48	20.6	43.0%	32	2.3	37	20.5	33	19.5	27	16.8	22
BAPTIST MEMORIAL HOSPITAL UNION COUNTY	153	46.6	30.5%	64	3.3	84	51.5	82	48.8	68	45.8	60
WEBSTER HEALTH SERVICES	43	17.9	41.7%	29	2.4	32	18.8	30	21.5	30	23.3	30
WINSTON MEDICAL CENTER	65	13.7	21.0%	23	4.8	25	13.8	22	12.7	18	11.6	15
YALOBUSHA GENERAL HOSPITAL	26	6.4	24.7%	13	4.0	12	8.1	13	8.5	12	9.0	12
GHSA 1 Totals	***2,504***	***1,119.3***	***44.7%***	***1,466***	***2.2***	***2,015***	***1,106.1***	***1,770***	***1,072.9***	***1,502***	***1,080.5***	***1,405***
General Hospital Service Area 2												
BOLIVAR MEDICAL CENTER	165	65.2	39.5%	86	2.5	117	63.0	101	59.4	83	65.3	85
NORTHWEST MS REGIONAL MEDICAL CENTER	175	80.9	46.2%	104	2.2	146	83.1	133	86.5	121	79.3	103
BAPTIST MEMORIAL HOSPITAL DESOTO	169	135.4	80.1%	165	1.2	244	144.3	231	153.5	215	153.4	199
UNIVERSITY HOSP & CLINICS HOLMES COUNTY	49	21.4	43.7%	33	2.3	39	16.0	26	9.3	13	13.9	18
HUMPHREYS COUNTY MEMORIAL HOSPITAL	25	8.4	33.6%	16	3.0	15	3.3	5	7.2	10	7.4	10
GREENWOOD LEFLORE HOSPITAL	228	103.1	45.2%	129	2.2	186	111.2	178	102.5	143	112.0	146
KILMICHAEL HOSPITAL	19	4.6	24.0%	10	4.2	8	8.0	13	8.0	11	6.5	8
TYLER HOLMES MEMORIAL HOSPITAL	49	9.7	19.7%	18	5.1	17	7.5	12	8.5	12	7.2	9
QUITMAN COUNTY HOSPITAL	36	13.6	37.8%	23	2.6	25	9.0	14	13.4	19	11.9	16
NORTH SUNFLOWER COUNTY HOSPITAL	36	10.9	30.2%	19	3.3	20	8.8	14	9.2	13	11.7	15
SOUTH SUNFLOWER COUNTY HOSPITAL	49	19.8	40.4%	31	2.5	36	18.9	30	18.2	25	16.7	22
TALLAHATCHIE GENERAL HOSPITAL	9	2.5	27.9%	7	3.6	5	3.0	5	3.6	5	2.6	3
DELTA REGIONAL MEDICAL CENTER	221	82.1	37.2%	105	2.7	148	93.1	149	1.9	3	120.1	156
KING'S DAUGHTERS HOSPITAL GREENVILLE	137	27.1	19.8%	41	5.0	49	36.5	58	105.2	147		0
GHSA 2 Totals	***1,367***	***584.7***	***42.8%***	***787***	***2.3***	***1,052***	***605.5***	***969***	***586.3***	***821***	***608.1***	***791***

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Hospital	*Licensed Beds*	*Averge Daily Census*	*Percent Occu-pancy*	*Beds Needed: Current Formula*	*Bed: ADC Ratio*	*Beds Licensed @ 180% of ADC (2004)*	*Hospital ADC (2004)*	*Beds Licensed @ 160% of ADC*	*Hospital ADC (2005)*	*Beds Licensed @ 140% of ADC*	*Hospital ADC (2006)*	*Beds Licensed @ 130% of ADC*
General Hospital Service Area 3												
MONTFORT JONES MEMORIAL HOSPITAL	71	29.3	41.3%	43	2.4	53	29.6	47	28.7	40	27.1	35
CLAIBORNE COUNTY HOSPITAL	26	7.6	29.2%	15	3.4	14	7.5	12	7.1	10	7.3	10
HARDY WILSON MEMORIAL HOSPITAL	49	18.7	38.2%	30	2.6	34	24.2	39	24.6	34	19.7	26
CENTRAL MISS MEDICAL CENTER	400	133.8	33.4%	164	3.0	241	139.5	223	136.6	191	138.5	180
MISS BAPTIST MEDICAL CENTER	541	296.8	54.9%	341	1.8	534	285.8	457	275.5	386	294.9	383
MISS METHODIST REHAB CENTER	44	7.4	16.8%	14	5.9	13	4.7	7	1.4	2	0.9	1
ST DOMINIC JACKSON MEMORIAL HOSPITAL	453	295.6	65.2%	340	1.5	532	297.6	476	266.4	373	258.8	336
UNIVERSITY HOSP & CLINICS UNIVERSITY OF	664	459.1	69.1%	514	1.4	826	460.3	736	422.2	591	403.8	525
PRENTISS REGIONAL HOSPITAL	41	14.4	35.0%	24	2.9	26	12.1	19	11.5	16	9.0	12
LAWRENCE COUNTY HOSPITAL	25	6.7	26.6%	13	3.8	12	5.9	9	6.2	9	6.2	8
LEAKE MEMORIAL HOSPITAL	42	9.1	21.6%	17	4.6	16	7.1	11	6.7	9	5.5	7
KING'S DAUGHTERS MEDICAL CENTER	122	46.5	38.1%	64	2.6	84	41.7	67	42.0	59	39.7	52
MADISON REGIONAL MEDICAL CENTER	67	14.7	21.9%	25	4.6	26	14.8	24	18.1	25	16.3	21
RANKIN MEDICAL CENTER	134	56.7	42.3%	76	2.4	102	58.0	93	65.8	92	62.7	81
RIVER OAKS HOSPITAL	110	89.6	81.4%	114	1.2	161	88.5	142	86.4	121	82.5	107
WOMANS HOSPITAL AT RIVER OAKS	111	24.7	22.2%	37	4.5	44	26.4	42	24.1	34	24.2	31
S E LACKEY CRITICAL ACCESS HOSPITAL	25	7.5	30.0%	15	3.3	14	8.0	13	10.2	14	4.5	6
SCOTT REGIONAL HOSPITAL	30	6.6	22.1%	13	4.5	12	16.0	26	15.9	22	16.8	22
SHARKEY ISSAQUENA COMMUNITY HOSPITAL	29	7.9	27.1%	15	3.7	14	8.3	13	7.8	11	7.0	9
MAGEE GENERAL HOSPITAL	64	29.2	45.7%	43	2.2	53	26.7	43	26.0	36	28.8	37
SIMPSON GENERAL HOSPITAL	49	17.9	36.5%	29	2.7	32	15.1	24	12.6	18	12.5	16
RIVER REGION HEALTH SYSTEM	269	154.3	57.4%	186	1.7	278	136.5	218	138.2	194	136.7	178
KING'S DAUGHTERS HOSPITAL OF YAZOO COUNTY	42	13.4	32.0%	23	3.1	24	11.0	18	10.4	15	11.9	15
GHSA 3 Totals	***3,408***	***1,747.4***	***51.3%***	***2,155***	***2.0***	***3,145***	***1,725.2***	***2,760***	***1,653.7***	***2,315***	***1,615.4***	***2,100***
General Hospital Service Area 4												
H C WATKINS MEMORIAL HOSPITAL	32	10.1	31.7%	18	3.2	18	7.5	12	7.5	11	6.2	8
ALLIANCE HEALTH CENTER	55	6.6	12.0%	13	8.4	12	7.0	11		0	14.3	19
JEFF ANDERSON REGIONAL MEDICAL CENTER	260	151.2	58.2%	183	1.7	272	154.7	247	155.9	218	146.1	190
RILEY MEMORIAL HOSPITAL	120	56.1	46.8%	75	2.1	101	52.2	84	46.5	65	39.0	51
RUSH FOUNDATION HOSPITAL	215	103.8	48.3%	130	2.1	187	107.9	173	93.3	131	93.4	121
NESHOBA COUNTY GENERAL HOSPITAL	82	24.8	30.2%	38	3.3	45	21.0	34	22.7	32	25.0	32
ALLIANCE-LAIRD HOSPITAL	50	15.3	30.6%	25	3.3	28	13.7	22	8.6	12	9.8	13
NEWTON REGIONAL HOSPITAL	49	14.0	28.6%	24	3.5	25	15.9	25	13.9	19	12.7	17
GHSA 4 Totals	***863***	***381.9***	***44.3%***	***506***	***2.3***	***687***	***379.9***	***608***	***348.4***	***488***	***346.5***	***450***
General Hospital Service Area 5												
NATCHEZ COMMUNITY HOSPITAL	101	46.3	45.8%	64	2.2	83	42.0	67	39.6	55	45.3	59
NATCHEZ REGIONAL MEDICAL CENTER	185	48.5	26.2%	66	3.8	87	50.1	80	44.6	62	56.4	73
FRANKLIN COUNTY MEMORIAL HOSPITAL	36	10.6	29.6%	19	3.4	19	12.5	20	13.0	18	14.8	19
JEFFERSON COUNTY HOSPITAL	30	17.3	57.6%	28	1.7	31	17.7	28	23.6	33	20.4	27
BEACHAM MEMORIAL HOSPITAL	37	20.2	54.6%	32	1.8	36	19.1	31	19.3	27	18.6	24
SOUTHWEST MS REGIONAL MEDICAL CENTER	150	79.4	52.9%	102	1.9	143	88.2	141	101.2	142	104.9	136
WALTHALL COUNTY GENERAL HOSPITAL	49	21.6	44.1%	34	2.3	39	22.6	36	19.3	27	15.2	20
FIELD MEMORIAL COMMUNITY HOSPITAL	25	6.4	25.7%	13	3.9	12	6.8	11	7.0	10	7.6	10
GHSA 5 Totals	***613***	***250.4***	***40.8%***	***358***	***2.4***	***451***	***259.1***	***414***	***267.7***	***375***	***283.3***	***368***

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	Licensed Beds	Averge Daily Census	Percent Occu-pancy	Beds Needed: Current Formula	Bed: ADC Ratio	Beds Licensed @ 180% of ADC (2004)	Hospital ADC (2004)	Beds Licensed @ 160% of ADC	Hospital ADC (2005)	Beds Licensed @ 140% of ADC	Hospital ADC (2006)	Beds Licensed @ 130% of ADC
General Hospital Service Area 6												
COVINGTON COUNTY HOSPITAL	82	17.5	21.3%	28	4.7	31	17.6	28	17.2	24	14.7	19
FORREST GENERAL HOSPITAL	429	262.7	61.2%	304	1.6	473	250.4	401	251.0	351	261.2	340
JASPER GENERAL HOSPITAL	16	0.6	3.5%	3	28.2	1	0.5	1	0.7	1	0.9	1
SOUTH CENTRAL REGIONAL MEDICAL CENTER	275	148.2	53.9%	179	1.9	267	148.0	237	151.2	212	151.3	197
WESLEY MEDICAL CENTER	211	108.8	51.6%	136	1.9	196	120.2	192	124.9	175	138.4	180
MARION GENERAL HOSPITAL	79	23.9	30.3%	36	3.3	43	20.1	32	19.8	28	29.9	39
PERRY COUNTY GENERAL HOSPITAL	22	5.2	23.7%	11	4.2	9	4.3	7	8.2	12	9.3	12
WAYNE GENERAL HOSPITAL	80	33.8	42.2%	49	2.4	61	32.4	52	33.7	47	33.6	44
GHSA 6 Totals	***1,194***	***600.6***	***50.3%***	***746***	***2.0***	***1,081***	***593.5***	***950***	***606.6***	***849***	***639.3***	***831***
General Hospital Service Area 7												
GEORGE COUNTY HOSPITAL	53	20.7	39.0%	32	2.6	37	26.2	42	25.4	36	24.4	32
HANCOCK MEDICAL CENTER	104	55.5	53.4%	75	1.9	100	53.5	86	48.0	67	14.6	19
BILOXI REGIONAL MEDICAL CENTER	153	85.3	55.8%	109	1.8	154	79.6	127	84.8	119	88.5	115
GARDEN PARK MEDICAL CENTER	130	60.0	46.1%	80	2.2	108	58.9	94	58.0	81	51.4	67
GULF COAST MEDICAL CENTER	144	43.4	30.1%	60	3.3	78	39.9	64	36.2	51	16.6	22
MEMORIAL HOSPITAL AT GULFPORT	303	201.0	66.4%	237	1.5	362	204.4	327	206.6	289	205.5	267
OCEAN SPRINGS HOSPITAL	136	91.3	67.1%	116	1.5	164	93.5	150	97.3	136	96.5	125
SINGING RIVER HOSPITAL	385	137.5	35.7%	168	2.8	247	127.7	204	108.1	151	98.5	128
L.O. CROSBY MEMORIAL HOSPITAL	95	24.8	26.1%	38	3.8	45	21.2	34	18.3	26	18.4	24
PEARL RIVER COUNTY HOSPITAL	24	4.5	18.7%	10	5.4	8	2.7	4	1.4	2	1.6	2
STONE COUNTY HOSPITAL	25	1.9	7.7%	6	12.9	3	1.9	3	3.8	5	5.5	7
GHSA 7 Totals	***1,552***	***725.8***	***46.8%***	***930***	***2.1***	***1,307***	***709.5***	***1,135***	***687.8***	***963***	***621.5***	***808***
TOTAL	***11,501***	***5,410.1***	***47.0%***	***6,949***	***2.1***	***9,738***	***5,378.8***	***8,606***	***5,223.4***	***7,313***	***5,203.0***	***6,764***

Source: Data, Mississippi State Department of Health, Division of Licensure and Certification, 2006; Calculations AHPA, 2007.

If planning for inpatient acute care services is to be rationalized, purposeful action will be necessary to reduce the surplus. The large statewide surpluses render the current bed need projection methodology largely ineffective or irrelevant. The current bed need methodology would work reasonably well were demand and capacity reasonably in balance. It is rendered ineffective, or irrelevant, in areas with large bed surpluses. Simply adjusting the formula would have little, if any, effect.

The current bed need projection methodology should be set aside. It should be replaced with a combined bed need projection and licensure formulation that would base the licensed bed capacity of each facility on the average inpatient census of the previous year (or the average of the previous three years). This method, combined with a policy change that would remove from the licensure rolls beds that have not been used for 12 months or more, offers the prospect of reducing systematically surplus capacity statewide. Models of variations of this methodology indicate that it can be implemented effectively and fairly (Tables 6 and 7).

Regardless of how quickly the surplus licensed bed capacity is reduced, a patient level database is needed to permit more effective population-based planning for inpatient hospital services and to permit identification of indigenous medical markets and trade patterns.

F. Recommendations

Replace Hospital Bed Need Formula: The current acute care bed need should be replaced with a less complex and more flexible formulation designed to reduce systematically excess capacity over a three to four year period. The most easily understood and applied formula, described above and in Appendix B, would determine the number of beds that may be licensed for use during a specified licensure period, usually one year. The number of licensed beds permitted is a function of the average daily census reported for the previous licensure period, usually the previous calendar or fiscal year, inflated by an assigned operating efficiency factor.

- Consideration should be given to exempting critical access hospitals from the program;
- Consideration should be given to establishing lower occupancy standards in rural areas than in urban and suburban areas

Develop a Patient Level Acute Care Database: Given Mississippi's distinct demography, relatively high acute care use rates that are likely to decrease and over the next decade, and the need to reduce excess capacity as fairly and efficiently as possible, a patient level hospital discharge database should be established as soon as possible.

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IV

Medical Equipment and Technology

A. Context

Mississippi regulates a number of medical services that require investment in costly clinical technologies and equipment that change rapidly. The planning methodologies specified in the Mississippi State Health Plan for some of these services have not kept pace with technological and market changes. Some of the methods reflect the perspective, and appear to assume, that the service will be provided largely to hospital inpatients. The majority of the care (procedures) provided by these services is to ambulatory patients in outpatient settings.

Planning practices and the review criteria and standards used should reflect practices that have been shown to be effective elsewhere. In addition to technological advances, this requires being attentive to ongoing research, changing demographic patterns and trends, economic incentives, and changes in the organization and delivery of health care and professional standards. Planning methods should be updated frequently to reflect, recent developments and trends.

Cost containment involves ensuring efficient use of costly technology and equipment, combined with the controlled diffusion (managed introduction and expansion) of these services as demand grows. Ensuring efficient use requires acknowledging the unstated distinction often made between service volume standards and system or equipment capacity. One of the more striking and useful aspects of technological change has been the dramatic increase in equipment and system capability and throughput. Average scan (procedure) times for CT, MRI, and PET-CT scanners, for example, have fallen dramatically over the last decade and are continuing to decrease. In some cases, the actual scan time has decreased to the point that it is a relatively small part of the overall procedure time. State-of-the-art CT and MRI scanner operating capacity has more than doubled over the last decade and is continuing to increase. PET-CT scan times too have decreased sharply and are expected to continue to decrease.

Diagnostic imaging is not the only service category benefiting from technological change. Advances in radiation therapy have improved its utility, and reduced both treatment planning and average procedure times. Radiation therapy technology continues to advance. The changes underway are likely to increase new patient caseloads somewhat, but may well reduce both the total number of treatments and the average treatment time, effectively increasing capacity and throughput.

B. Cardiovascular Services

Initially used largely to confirm and evaluate coronary artery disease, cardiac catheterization increasingly is being used therapeutically. In therapeutic cardiac catheterization, variously referred to as coronary angioplasty or percutaneous coronary intervention (PCI)[21], catheters are used to deliver drugs, mechanical devices, and other therapeutic agents to the heart and its blood vessels.

Therapeutic catheterization of all types now constitutes between one-third and one-half of cardiac catheterizations performed; the percentage that is therapeutic is increasing.[22] The growing utility of therapeutic catheterization has expanded the range of treatment options available to those with coronary artery disease. Use of these techniques has reduced reliance on cardiac surgery for many patients, and has postponed it for others. The percentage of those having cardiac surgery shortly after diagnostic catheterization has decreased as the percentage of those receiving therapeutic catheterization has grown.[23]

The number and percentage of catheterization patients receiving invasive therapeutic intervention in some form have increased significantly over the last two decades (Chart I). Experience among programs varies widely, but overall between one-half and two-thirds of those receiving diagnostic cardiac catheterization now receive therapeutic intervention shortly thereafter, either some form of PCI, cardiac surgery, or both if therapeutic catheterization fails or ultimately proves ineffective.[24]

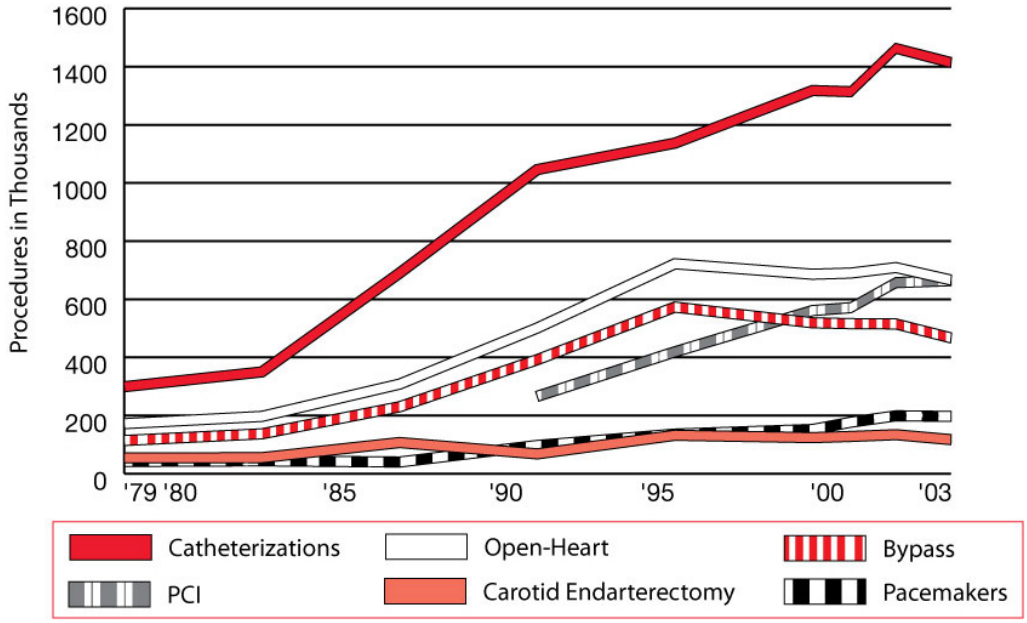
Although aggregate demand for open-heart surgery continues to grow modestly, cardiac surgery rates appear to have peaked and may decrease significantly over the next decade. The decrease results from greater reliance on therapeutic cardiac catheterization (PTCA, PCI) which has increased steadily for more than a decade (Chart 1). The number of PCI procedures performed each year now exceeds the number of coronary bypass graft surgery (CABG) procedures and is likely soon to exceed the number of all cardiac surgery procedures. Much cardiac catheterization is now performed without an overnight hospital stay. It is likely that the large majority of both diagnostic and therapeutic cardiac catheterization procedures soon will be performed as outpatient services**.**[25]

The effective substitution of PCI procedures for CABG surgery may further reduce average procedure risk and, consequently, overall lifetime risk for some cardiac patients. The potential affect of the development of more sophisticated imaging technologies (e.g., CT, MRI, PET) is not known, but may be significant for both CABG surgery and PCI demand. Advanced CT (CTA) and MRI (MRA) imaging could reduce the number of diagnostic cardiac catheterizations significantly within a few years and may affect demand for PCI. Cardiac catheterization programs are likely to focus increasingly on therapeutic applications and procedures. The growing role and significance of CT and MRI imaging in interventional cardiology is indicated by the recent publication of appropriateness guidelines for the use of these technologies by the American College of Cardiology.[26]

- ***Recent Research***

Increased reliance on procedures (e.g., PCI) rather than medical management for many of those with cardiovascular disease has been debated for more than a decade. Up to now, procedure-based techniques have been gaining favor steadily. Recently released research raises fundamental questions about the

Chart 1: Trends in Cardiovascular Operations and Procedures, U. S. 1979 - 2003



Source: CDC/NCHS and NHLBI, 2006.

value of increased reliance on PCI as the treatment of choice for stable (non-acute) coronary artery disease patients. In a large clinical trial that "compared optimal medical therapy alone or in combination with PCI as an initial management strategy in patients with stable coronary artery disease" medical researchers found that "although the addition of PCI to optimal medical therapy reduced the prevalence of angina, it did not reduce long term rates of death, nonfatal myocardial infarction, and hospitalization for acute coronary syndromes."[27] The analysts noted that these findings are consistent with a "meta analysis" of all earlier studies assessing the comparative value of medical management versus PCI procedures in treating coronary artery disease.[28] All of these studies have found that, whatever their value in giving prompt relief from angina, PCI procedures have "no effect in reducing major cardiovascular events."[29]

The researchers observed that their findings support existing clinical practice guidelines, which are based on the belief that PCI "can be safely deferred in patients with stable coronary artery disease . . . provided that intensive, multifaceted medical therapy is instituted and maintained." In short, medical therapy without PCI can be used in a majority of patients with stable coronary artery disease. The analysts indicate that perhaps one-third of patients with stable coronary artery disease that are treated medically

may require PCI at a later date for symptom (e.g., angina) control, or as a result of an acute coronary episode. The near and long term affect of these findings on PCI service volumes is unknown, but could result in lower PCI use rates (and aggregate demand) as a result of preference for less costly and less risky medical treatment and management for patients with stable coronary artery disease.

These studies do not appear to challenge, or otherwise conflict with, earlier studies that have found PCI especially useful in the timely emergency treatment of a selected subset of heart attack patients.[30] So, one implication of the findings would be fewer cardiac catheterizations, but a higher percentage of ***primary*** (emergency) procedures among the catheterizations performed.

- ***Regulatory Patterns and Practices***

A substantial majority of the states that regulate cardiovascular services require onsite cardiac surgery support (backup) for therapeutic catheterization.[31] Twenty-two of the 26 states (including the District of Columbia) that regulate cardiovascular services under CON require onsite open-heart surgery for PCI procedures. Five states (Delaware, Hawaii, Illinois, Missouri and New Hampshire) with CON programs explicitly do not require onsite open-heart surgery support for PCI procedures. In most cases, this results from idiosyncratic regulatory language rather than from substantial policy considerations.

Both of the states that regulate cardiovascular services under their licensure programs (Ohio and Pennsylvania) require onsite open-heart surgical support for PCI.

- ***Onsite Open Heart Surgery Waivers***

Historically, risks associated with cardiac catheterization have been such that professional guidance, and nearly all state standards, required that open-heart surgery services be onsite where cardiac catheterization was performed. Technological advances, experience, and improved clinical practice have reduced significantly mortality associated with both cardiac catheterization and surgery. Evidence has been accumulating for some time to show that, under carefully controlled circumstances, cardiac catheterization can be provided safely without onsite open-heart surgery services. The requirement (standard) that there be onsite surgery support for diagnostic catheterization has been relaxed as the complication and mortality rates have decreased and as professional standards have changed. Few states now require onsite surgery support for diagnostic cardiac catheterization.

Some argue that a similar step can now be taken with therapeutic cardiac catheterization (PCI). Although both complication rates and mortality associated with PCI have decreased, an irreducible risk remains. As with open-heart surgery, the underlying risk appears to be inversely related to program volume. Thus, service providers, planners and regulators are faced with the difficult task of weighing the risk of offering PCI at sites without immediate (onsite) surgery backup, and at sites where expected (projected) program volume would be relatively low, against the risk inherent in delaying treatment

(intervention) in order to transport patients to comprehensive cardiovascular service sites.[32]

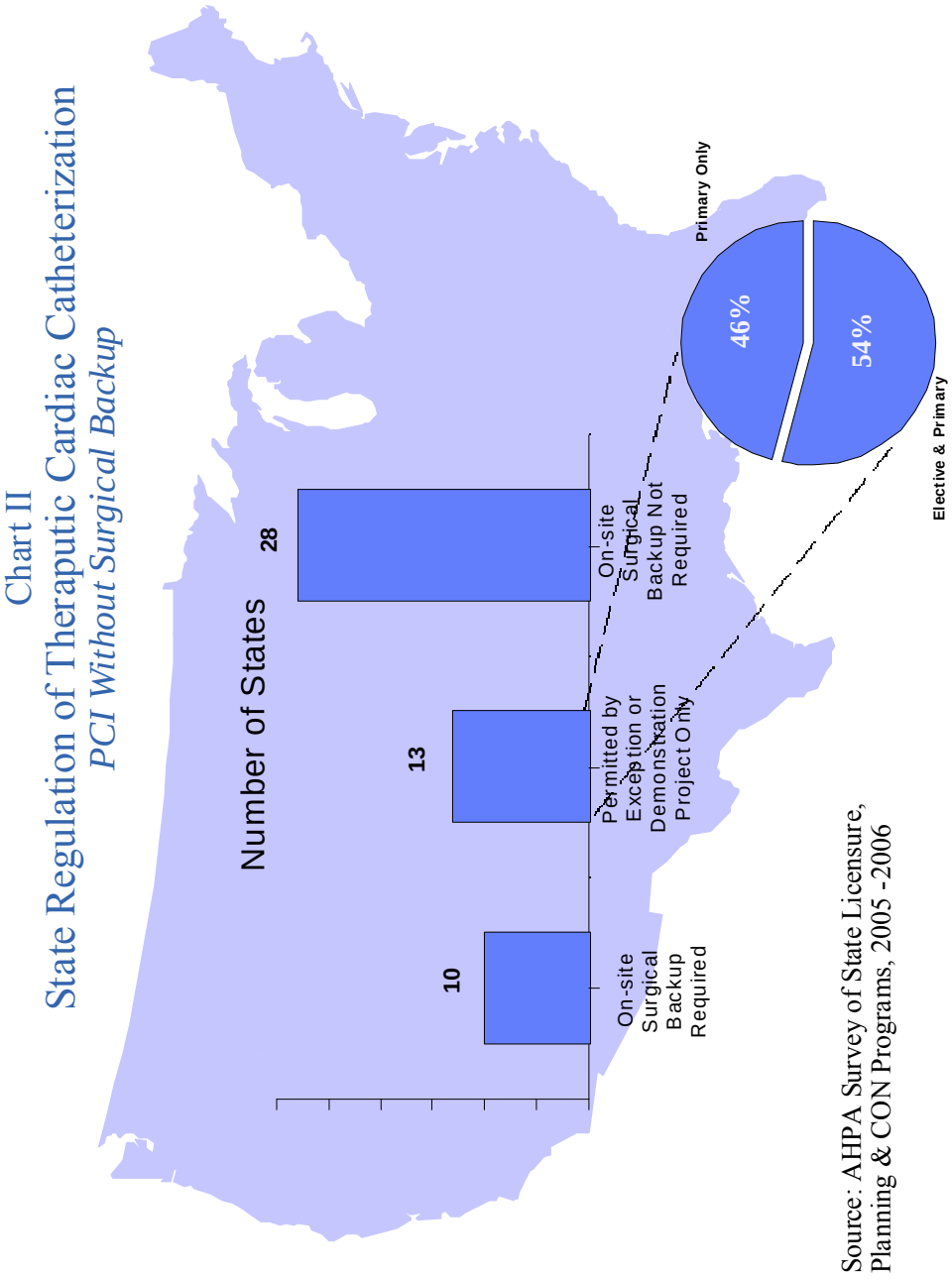
A number of states have taken steps to expand access to PCI while trying to ensure that patient safety and treatment outcome are not jeopardized. Some distinguish between ***primary*** (emergency or rescue) PCI, and ***elective*** (schedulable) therapeutic procedures. In weighing the relative value and risks of making PCI available under prescribed circumstances, they have concluded that, for some patients, the risk of delay in receiving treatment is greater than the risk of providing the service at a site without immediate surgical support or in a program with lower volume and less experience. They permit exceptions to the onsite surgery requirement for primary PCI but not for elective PCI.

Unlike with diagnostic cardiac catheterization, few states have eliminated the general requirement that there be onsite surgical support for PCI procedures. Rather, they have established carefully designed demonstration projects and exception (waiver) processes that permit the provision of PCI to certain patients under defined protocols and circumstances. In these states, hospitals that meet prescribed standards and protocols are permitted to offer PCI without onsite surgery support. In most cases, waiver and demonstration programs have incorporated the professional guidelines and standards recommended by the American College of Cardiology and the American Heart Association.

Of the twenty-four states (including the District of Columbia) that require onsite open-heart surgical support for PCI procedures, at least thirteen have adopted regulatory provisions that waive the requirement for the provision of ***primary*** PCI at selected hospitals that meet qualifying requirements (Chart II).[33] Slightly more than half (54%) of states with demonstration projects, or with other exceptions to the onsite surgery backup requirement, permit both elective and primary PCI procedures to be performed (Chart II).

The waiver provisions of six of these states (Alabama, Hawaii, Maryland, Missouri, Pennsylvania, West Virginia) also permit qualifying hospitals to perform ***elective*** PCI without onsite surgical support. In addition, at least four other states (Connecticut, New Hampshire, Rhode Island, Washington) are now considering adopting waiver programs modeled after programs now in place elsewhere.[34]

Nearly all of the states with demonstration projects or waiver programs base their standards and protocols on contemporaneous research and expert opinion, particularly the recommendations of the American College of Cardiology (ACC) and the American Heart Association (AHA). Many also have built into their demonstration programs the requirement that data must be submitted to independent external registries[35] and that the results of the initiative assessed by an independent outside professional entity (e. g., university medical center).



- ***Professional Planning Guidelines and Standards***

Most states adhere closely to the guidelines and standards recommended by the American College of Cardiology (ACC), the American Heart Association (AHA), and the Society for Cardiac Angiography and Interventions (SCAI) in planning and regulating cardiac catheterization and open-heart surgery services. The ACC/AHA Task Force on Practice Guidelines recommends that hospitals performing *elective* PCI have cardiac surgery services available on site. Because angioplasty is an evolving technology, the ACC/AHA Task Force has reviewed this policy guidance on four occasions over the last two decades. The current recommendation reaffirming the onsite cardiac surgical backup

requirement for elective PCI was completed in 2005. It reflects several important planning considerations, namely the benefit—in terms of better treatment outcomes—of ensuring

- PCI is performed by high volume practitioners in high volume programs;
- Timely response to post-intervention complications; and
- The availability of services required for any specialized follow-up care.

The 2005 ACC/AHA/SCAI percutaneous coronary intervention (PCI) guidelines reexamined all questions raised recently concerning the provision of both ***primary*** and ***elective*** PCI in settings without onsite cardiac surgery backup. They distinguish between primary (emergency) PCI for certain patients and elective PCI. The guidelines note that interventional cardiology has been, and remains, a rapidly changing field. They also note that improvement in PCI equipment and techniques have reduced greatly the frequency of urgent transfer of patients to cardiac surgery where onsite surgical backup in available. Nevertheless, the updated guidelines:

- Continue to support the provision of ***primary*** PCI in settings without open-heart surgery only for selected patients under specified circumstances; and
- Reconfirm the earlier recommendation that ***elective*** PCI occur only at sites with surgical backup.

The guidelines recommend minimum procedure volumes for practitioners (interventional cardiologists) and catheterization programs. The recommendation regarding ***primary*** PCI reads:

> "Primary PCI for patients with STEMI might be considered in hospitals without on-site cardiac surgery, provided that appropriate planning for program development has been accomplished, including appropriately experienced physician operators (more than 75 total PCIs and, ideally, at least 11 primary PCIs per year for STEMI), an experienced catheterization team on a 24 hours per day, 7 days per week call schedule, and a well-equipped catheterization laboratory with digital imaging equipment, a full array of interventional equipment, and intra-aortic balloon pump capability, and provided that there is a proven plan for rapid transport to a cardiac surgery operating room in a nearby hospital with appropriate hemodynamic support capability for transfer. The procedure should be limited to patients with STEMI or MI with new or presumably new LBBB on ECG and should be performed in a timely fashion (goal of balloon inflation within 90 minutes of presentation) by persons skilled in the procedure (at least 75 PCIs per year) and at hospitals that perform a minimum of 36 primary PCI procedures per year."[36]

As noted above, clinicians performing primary PCI for STEMI (ST-segment elevated myocardial infarction) patients should be experienced operators who perform more than 75 elective PCI procedures per year with at least 11 PCI procedures for emergency STEMI patients a year. It is recommended that these procedures be performed in programs that perform more than 400 ***elective*** PCI procedures per year, including at least 36 primary PCI procedures for STEMI patients annually.

The guidelines also indicate that primary PCI should be performed as quickly as possible, with a goal of "medical contact-to-balloon or door-to-balloon time within 90 minutes".[37]

The ACC/AHA/SCAI recommendation is cautious and specific regarding ***elective*** PCI. Elective PCI should not be performed at institutions that do not provide on-site cardiac surgery. [38] The statement acknowledges that "several centers have reported satisfactory results based on careful case selection with well-defined arrangements for immediate transfer to a surgical program," but notes that "a small, but real fraction of patients undergoing elective PCI will experience a life-threatening complication that could be managed with the immediate on-site availability of cardiac surgical support but cannot be managed effectively by urgent transfer." The statement also noted that researchers have documented higher mortality among Medicare patients undergoing elective PCI in institutions without onsite cardiac surgery. Interventionists who perform ***elective*** PCI should do at least 75 procedures annually, preferably at high-volume centers (more than 400 procedures) with on-site cardiac surgery support.[39]

The 2005 PCI guidelines acknowledge the difficult questions inherent in establishing interventional programs in remote and rural areas. Notwithstanding the desirability of improved access to timely care, the guidelines do not support catheterization laboratories in rural areas, or those distant from existing cardiac catheterization programs, where there is not sufficient surgical volume to support an onsite cardiac surgery program.

The guidelines note that research is ongoing and indicate that the standards recommended for both primary and elective PCI, and those that might apply to rural areas, are under continuous review and subject to revision, as accumulating clinical data and experience warrant. They also acknowledge that evidence appears to be growing that PCI may be performed without undue risk in some situations, and that these data will continue to be followed closely.

As discussed earlier, recently released research concerning the value of increased reliance on PCI, in lieu of medical treatment and management, for stable coronary artery disease patients appear to support the cautious approach reflected in the current ACC/AHA guidelines. It is likely that most states will continue to rely on the guidelines in planning for cardiac catheterization and CABG surgery programs.

The most recent professional consensus statement on performing PCI without onsite cardiac surgery backup was issued by the Society for Cardiovascular Angiography and Interventions (SCAI) in February 2007. Noting that "an increasing number of patients suffering from heart attack or coronary artery disease are undergoing stenting and other catheter-based heart therapies in hospitals without on-site cardiac surgery, both in the United States and around the world," SCAI and a number of other medical organizations recommended set of quality standards for these stand alone services.[40]

The expert panel argues that adoption of the guidelines "is not an open endorsement of PCI without on-site surgical back-up. Instead, we are acknowledging that it may be appropriate in some settings, and offering our expert consensus on how such programs

should be organized, supervised, and performed."[41] The consensus statement recommends that PCI programs operating without on-site cardiac surgery:

- Maintain service (program) volumes of at least *200 PCIs* per year;
- Employ interventional cardiologists who have performed at least *500 PCIs*, have an ongoing annual case volume of more than *100 PCIs*, and meet national benchmarks for procedural success and complication rates;
- Train all support personnel in the management of PCI patients;
- Select patients carefully to control the risk of complications;
- Establish a close alliance with cardiovascular surgeons, including formalized and tested protocols for emergency transfer of patients;
- Activate emergency transport at the first clear signs of a PCI complication, ensuring that the time to the initiation of cardiopulmonary bypass does not exceed 120 minutes; and
- Collect appropriate outcomes data and submit them for comparison with state or national performance standards.[42]

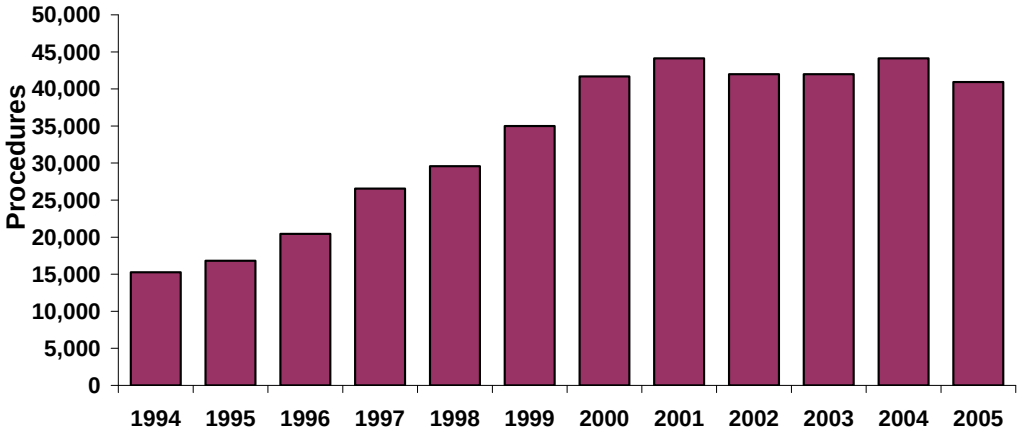
Whatever the intent of the expert panel, it is highly likely that the recommendations will soon come to be interpreted as at least an indirect endorsement of expanding PCI services to more settings without on site cardiac surgery programs.

1. Mississippi Experience

Cardiovascular service use and development in Mississippi have followed the national patterns described above. As with acute care hospital and nursing home use and development, both use rates and capacity are relatively high in Mississippi. The open-heart (CABG) surgery caseload increased from fewer than 2,500 cases in 1994 to more than 4,500 cases in 2000. Annual service volumes have varied since peaking in 2000, but the direction is decidedly downward. Overall, open-heart surgery volumes are now about 10% lower than in 2000. Open-heart surgery use rates show a similar pattern. The surgical rate increased from about 0.8 cases per 1,000 persons in 1994 to nearly 1.7 cases per 1,000 persons in 2000. The rate has decreased to fewer than 1.4 cases per 1,000 persons currently.[43]

The same pattern holds for cardiac catheterization. The number of cardiac catheterization procedures performed increased from fewer than 15,000 cases in 1994 to more than 43,000 in 2000. Annual service volumes have varied since 2000, but have decreased only modestly (Chart 3). During the last two years annual service volumes have been about 41,000, approximately 5% below the peak in 2000. Cardiac catheterization use rates more than doubled between 1994 and 2004, growing from fewer than 6.0 cases per 1,000 persons in 1994 to more than 14.0 cases in 2000. The use rate has varied between 14.0 and 15.0 cases per 1,000 persons since 2000. Rates now appear to be stable, with no evidence of a trend in either direction.

Chart 3
Cardiovascular Service Use
Mississippi, 1994 - 2005
Cardiac Catheterization Procedures



Source: Mississippi State Department of Health , 2007.

Currently, demand for cardiovascular services in Mississippi is high. Use rates are marginally higher than national rates, and are generally comparable with those in most peer states with CON programs. There is adequate cardiac surgery and cardiac catheterization capacity statewide and in all planning regions. Beyond economics, the principal barrier to care is the lack of services in rural areas that do not have sufficient population to support cardiac catheterization and/or open-heart surgery programs. The most notable aspect of reported cardiac catheterization use data is the low percentage of procedures that are therapeutic. During the last two years, about 20% percent of all catheterizations procedures in Mississippi were therapeutic in purpose. This compares with 40% or more in many states and communities.

Average state and regional service volumes are generally consistent with planning standards and with the recommendations of professional organizations with special expertise in cardiovascular services. Nevertheless, a few programs have had very low service volumes in recent years. Given the well-established connection between service volume and treatment outcome for both catheterization and cardiac surgery, care should be taken to avoid authorization of programs likely to have unusually low service volumes, the desire to improve geographic access to care notwithstanding.

Cardiac catheterization planning and need determination criteria and standards appear to be written from the perspective that cardiac catheterization is essentially an inpatient service. Current policy restricts provision of therapeutic cardiac catheterization to hospitals with on site open-heart surgery. This policy, based on understandable concerns for treatment outcome and patient safety, is in conflict with the concern expressed in the

plan about limited access to cardiovascular services in rural areas and among minority populations. A majority of states now permit, in one form or another, the provision of therapeutic catheterization, especially primary PCI, at community hospitals without open-heart surgery. There is considerable evidence that permitting qualifying community hospitals without open-heart surgery to provide primary PCI to certain patients is one of the more effective ways of improving access to critical cardiovascular services.

As with many other acute care services data to document and assess cardiovascular services is limited. There is a pressing need for a data system to permit more effective monitoring and planning for cardiac surgery and cardiac catheterization.

2. Conclusions and Findings

Increased reliance on procedures, such as PCI, rather than medical management is a documented trend in the delivery of medical care, especially in the treatment of cardiovascular disease. This trend has been called into question recently by research showing that medical management may be appropriate (or superior) for patients with stable coronary artery disease. Thus, planning and regulation of cardiac catheterization services now takes place in an unsettled environment. The challenge is how to ensure the orderly diffusion of these technologies in ways that assure quality, avoid unnecessary capital costs, minimize system disruption and dislocation, and support cooperative and integrated medical practice.

Most states adhere closely to the guidelines and standards recommended by the American College of Cardiology (ACC), the American Heart Association (AHA), and the Society for Cardiac Angiography and Interventions (SCAI) in planning and regulating cardiac catheterization services. The guidelines recommend elective PCI be performed only at hospitals where there is on site cardiac surgery support. They recommend that primary (emergency) PCI performed at hospitals without on site surgical support be restricted to a specific category of patients and that the hospital meet a number of quality assurances standards.

Service providers, planners and regulators are faced with the difficult task of weighing the risk of offering PCI at sites without immediate (on site) surgery backup, and at sites where expected (projected) program volume would be relatively low, against the risk inherent in delaying treatment (intervention) in order to transport patients to comprehensive cardiovascular service sites.

More than half of the states that require onsite open-heart surgical support for PCI procedures have adopted regulatory provisions that waive the requirement for the provision of ***primary*** PCI at selected hospitals that meet qualifying requirements. Slightly more than half (54%) of states with demonstration projects or other exceptions to the onsite surgery backup requirement permit both elective and primary PCI procedures.

Nearly all of the states with demonstration projects or waiver programs base their standards and protocols on contemporaneous research and expert opinion, particularly the recommendations of the American College of Cardiology (ACC) and the American Heart

Association (AHA). Many also have built into their demonstration or exception programs the requirement that data be submitted to independent external registries

Demand for cardiovascular services in Mississippi is high. Use rates are marginally higher than national rates and are generally comparable with those in most peer states with CON programs. There is adequate cardiac surgery and cardiac catheterization capacity statewide and in all planning regions. A notable aspect of cardiac catheterization service delivery patterns is the comparatively low percentage of therapeutic procedures.

The principal barrier to care is the lack of services in rural areas that do not have sufficient population to support cardiac catheterization and/or open-heart surgery programs.

3. Recommendations

Waiver Program: Consideration should be given to establishing a formal PCI waiver/demonstration program tailored to the needs of Mississippi. More than a dozen states have formal therapeutic cardiac catheterization demonstration or exception projects that permit PCI procedures to be offered without on site cardiac surgery. Those programs should be examined to determine whether aspects of them could be appropriately applied in Mississippi. [Note: A detailed description of the Maryland program is incorporated by reference and submitted separately.]

ACC/AHA Guidelines and Standards: The Mississippi State Health Plan should be revised to indicate that, unless otherwise indicated, the professional planning guidelines and standards for open-heart surgery and cardiac catheterization recommended by the American College of Cardiology and the American Health Association will be followed in determining the need for open-heart surgery and cardiac catheterization services.

Planning Language: The Mississippi State Health Plan appears to be written from the perspective that therapeutic cardiac catheterization (PCI, PTCA) is essentially, or largely, an inpatient service. The description and discussion of therapeutic catheterization should be revised to reflect that therapeutic catheterization increasingly is an outpatient service.

Data Collection: The existing cardiovascular services data collection system should be improved. Data should be collected that would distinguish between inpatients and outpatients, by gender, type (procedure code), and zip code.

C. Interventional Radiology, Neuroradiology

1. Context

Interventional radiology emerged as a distinct hospital service in the 1980s, when technological innovation and clinical experience gained from diagnostic angiography began to make it possible to treat, as well as diagnose, vascular lesions and related conditions using minimally invasive endovascular methods. Initially, most therapeutic procedures were performed in multi purpose "special procedures rooms" (laboratories). These rooms often were used for cardiac catheterization, diagnostic anteriography, and therapeutic interventional procedures. This remains the case in facilities with low service volumes.

As medical imaging becomes more interventional and surgery becomes less invasive, interventional radiology procedures are increasingly both diagnostic (seeking or confirming clinical information) and therapeutic (providing definitive treatment). In many cases both diagnostic and therapeutic procedures are performed in the same session (same visit to the laboratory). Most of these are percutaneous endovascular procedures, undertaken with imaging guidance that enhances visualization of anatomical features and permits directed use of therapeutic devices and pharmaceuticals.

Currently, most existing operating rooms cannot accommodate some of the advanced imaging equipment and the number of specialists necessary for many cases. Similarly, many traditionally designed imaging procedure rooms do not provide the surgical environment needed to control the flow of materials, supplies and people or the air quality required for invasive procedures. Consequently, the function, design, and location of surgical suites and interventional laboratories, and their relationship to other services, are being reexamined.

Interventional radiology is growing rapidly because it offers a number of clinical and economic advantages:

- Risk, pain, and recovery time are significantly reduced in many cases;
- Many procedures can be performed on an outpatient basis, avoiding an overnight stay in the hospital;
- General anesthesia is usually not required;
- Endovascular techniques and advanced imaging permit access to, and treatment of, some lesions otherwise untreatable with acceptable risk;
- Hospital stays for interventional procedures that require inpatient care and observation are shorter than for alternative procedures (usually open surgery); and
- Generally, minimally invasive interventional procedures are less costly than the alternative surgical procedures they replace.

For most interventional radiology procedures, catheters and associated instruments are inserted percutaneously, through a small incision in the skin, into blood vessels and advanced to lesions to be evaluated and/or treated. Normally, stitches are not needed to close the incision.

The number and array of interventional procedures has been growing steadily for more than a decade. Currently, the ten most common interventional radiology procedures fall into the categories listed in Table 1.

Table 1
Common Interventional Radiology Procedures

Angiography	Central Venous Access (Establish & Maintain)
Angioplasty & Stent Placement	Deep Vein Thrombosis (Declotting Procedures)
Adominal Aortic Aneurysm Repair	Embolization
Biliary Drainage	Needle Biopsy
Catheterization Procedures	Vertebroplasty

Source: American College of Radiology, Telephone Discussion, Septermber 2007.

There are a number of interventional radiology technologies and devices in early stages of diffusion to the medical community and many more in clinical trials. Reliance on, and demand for, interventional radiology procedures is expected to grow steadily.

The American College of Radiology estimates that, depending on the definition used, between 9% and 12% of radiologists are principally interventionists, with about 5,000 interventional radiologists, including about 300 neuroradiologists nationwide.[44] Fewer than half of interventional radiologists spend more than two-thirds of their time performing interventional procedures. Most practitioners provide a relatively wide array of interventional procedures and work in both inpatient and outpatient settings. The number of qualified neuroradiologists varies widely among states and communities.

2. *State Planning and Regulation*

In contrast to cardiac catheterization, there has been little formal planning for interventional radiology (and neuroradiology) as a defined set of procedures or as a distinct hospital service. The reasons for this are largely adventitious, but understanding them may be helpful to those contemplating improving planning and regulation of interventional services. The principal reasons include the timing of the emergence of various interventional techniques, the technological distinctiveness of the service, and the perceived need to regulate it.

Interventional radiology and cardiac catheterization emerged in different political environments. Cardiac catheterization emerged as a major hospital service line in the mid 1970s, as planning and regulation of health services was being implemented nationwide. Interventional radiology began to develop as a major service line more than a decade later, in the late 1980s, coinciding with what arguably may have been the peak of opposition to community-based planning and regulation of health services. Consequently,

most state certificate of need (CON) programs included cardiac catheterization as one of the enumerated services subject to review. Interventional radiology was not included as a defined distinct service and, given the changed political environment, usually was not added later.

Most other services covered by CON regulation are easily identifiable, usually by a small number of procedure codes (e.g., ICD 9 and CPT). Cardiac catheterization, for example, is well defined and described by fewer than ten ICD 9 codes (and related CPT codes for outpatient procedures). By contrast the term interventional radiology refers to a wide array procedures, rather than to a single procedure or a small group of related procedures. Scores of ICD 9 and CPT codes are required to describe the array of discreet procedures that may be properly described as interventional radiology or neuroradiology.

Heretofore, most states have seen little need to regulate interventional radiology as a distinct hospital service line. The underlying rationale for regulating cardiac catheterization, for example, did not appear to apply to interventional radiology services. Compared with interventional cardiology procedures, most interventional radiology procedures have been less costly to offer, have been more widely available, and have not been shown to have inverse service volume-treatment outcome relationships. Interest in planning and regulating interventional radiology has increased with the advent of endovascular treatment alternatives to complex surgical cases, and with the increased cost of interventional laboratory equipment and services.

Because of this history states have not developed service-specific planning standards for interventional radiology services, facilities, or equipment. Few distinct interventional radiology projects have been considered under CON regulation nationwide. Those that have been considered have been subject to review not because of the nature or type of the project, but because the laboratory proposed was part of a larger capital project or because the laboratory equipment exceeded the medical equipment capital expenditure review threshold specified under the state CON program. Because most interventional laboratory capital costs historically have been well below the state medical equipment capital expenditure review threshold, few distinct projects have been subject to review.

Where interventional radiology laboratories have been subject to review, in most cases they have been reviewed using general review criteria that apply to all projects and using those elements of cardiac catheterization laboratories review criteria, e.g., average procedure times, assumed useful life, scheduled work hours, that apply to interventional laboratories generally. A number of states also indicate that they rely on the professional interventional laboratory operating standards developed and recommended in the American Heart Association Intercouncil consensus report titled “Optimal Resources for the Examination and Endovascular Treatment of the Peripheral and Visceral Vascular Systems”.[45]

- ***Representative Interventional Radiology Procedures***

Broadly defined to include neuroradiology and imaging guided surgical procedures, the interventional radiology market is large and complex. It includes an array of procedures that range widely in terms of complexity, risk, and cost. Procedures such as abdominal aorta and carotid artery repair, though minimally invasive and preferable to open surgery, entail high relative risk, are costly, and are performed in hospitals. Many others such and peripheral arteriograpy/angiography, angioplasty and embolic procedures are less risky, less costly, and are performed in both inpatient and outpatient settings. Still others, e.g., most needle biopsies and vertebroplasty (and kyphoplasty), entail little risk, are less expensive and are largely outpatient procedures.

Unlike cardiac catheterization, comparatively little interventional radiology data is consistently reported, gathered and analyzed. There is no reliable, readily accessible set of data that can be used to determine accurate current demand, much less project future demand, for the field as a whole. The procedures discussed below are presented to give an indication of the array of procedures performed and some of the stronger trends underway that are likely to influence significantly demand over the expected useful like of most interventional radiology equipment, i.e., over the next decade.

- ***Abdominal Aortic Aneurysm Diagnosis and Treatment***

An abdominal aortic aneurysm (AAA) is a weak area in the wall of the aorta, the main blood vessel that carries blood from the heart to the rest of the body. Traditional treatment entails major abdominal surgery to replace the defective part of the aorta with a graft. Such operations may require a week or more hospitalization and months of recovery.

Endovascular stent-grafts have emerged as a promising catheter-based approach to the repair of abdominal aortic aneurysms. During this imaging guided procedure, the stent-graft is placed in the aorta, extending above and below the aneurysm, effectively isolating the aneurysm (the bulge area) from blood flow and pressure. This endovascular procedure involves significantly less risk, less pain, and much shorter recovery time (Table 2). In addition, the treatment provides an alternative for patients who are too sick to undergo open surgery.[46]

Experience to date suggests that in carefully selected patients stent-graft repair of AAA is safe and effective and, for eligible patients, preferable to conventional surgery. As shown in Table 2, reported stent-graft procedure morbidity is significantly lower than with conventional surgery, with fewer major complications, less need for recovery in intensive care units, and lower overall blood loss. The average hospital stay is only about one-third that of surgical patients, and recovery time less than one-fourth that of surgery patients.

The initial success of endovascular treatment of AAA suggests that reliance on the procedure is likely to continue to grow. Between 1998 and 2002, for example, there was a substantial shift in the mix of AAA repair procedures reported. The total number of AAA

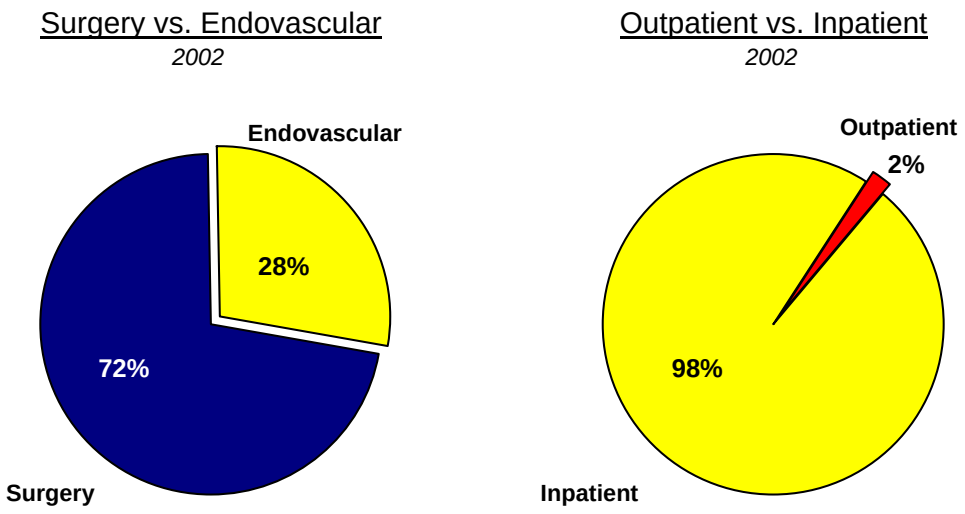
Table 2
Abdominal Aortic Aneurysm Repair
Stent-grafts Versus Open Surgical Repair
Comparison of Procedure Outcomes

	Parameter		
Outcome Measure	***Open Surgical Repair*** [N = 28]	***Stent-Graft*** [N = 28]	***Statistical Significance*** p Value
Blood loss (ml)	1,287	498	<0.01
Days in intensive care unit	1.75	0.1	0.008
Length hospital stay (days)	10.3	3.9	0.0001
Deaths	0	0	NS
Total complications	20	20	NS
Local complications	2	16	<0.001
Remote or Systemic Complications	18	4	<0.001
Recovery time (days)	47	11	0.0001

Source: Brewster DC, Geller SC, Kaufman JA, *et al*., "Initial experience with endovascular aneurysm repair: comparison of early results with outcome of conventional open repair," *Journal of Vascular Surgery,* 1998; 27:992-1005. NS = Not Significant

repairs grew by a modest 7%, but the total number of open surgical repairs decreased by nearly 23%. All of the decrease reflected a shift to endovascular repair procedures. By 2002, minimally invasive stent-graft procedures accounted for about 28% of AAA repair procedures (Chart 1). Although the shift to minimally invasive procedures has been substantial, most AAA repair procedures remain inpatient procedures (Chart 1).

Chart 1
Abdominal Aorta Aneurysm Repair
2002



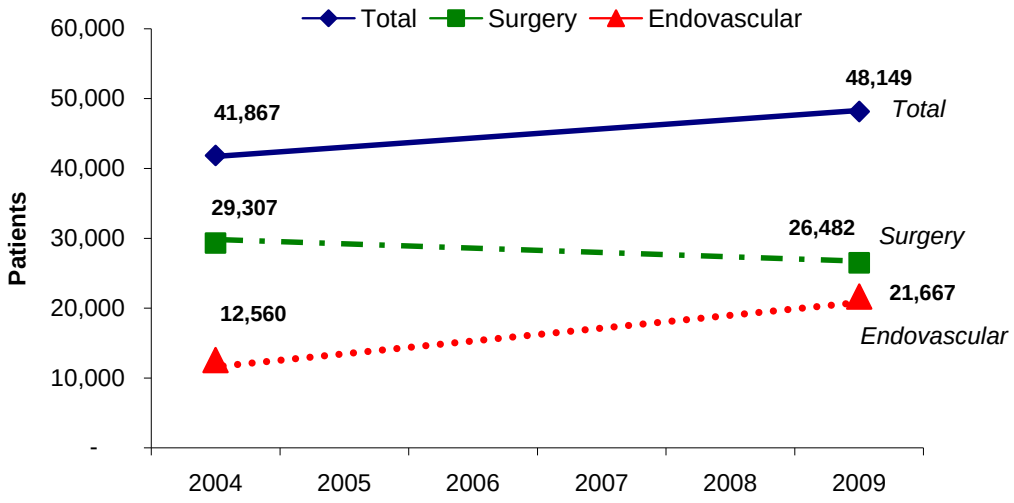
Patient Population = ICD9 Codes 3804, 3814, 3834, 3844, 3864, 3884, and CPT Code 75952.
Source: *Future of Vascular Services* , The Advisory Board, 2005, p. 32.

The developmental pattern seen between 1998 and 2002 is likely to continue. Estimated growth through 2009 (2004 – 2009) suggests that the overall rate of growth (about 13% over five years) is likely to be steady and higher than during the previous five years. Endovascular procedures will continue to supplant open surgical procedures. Open surgical repair procedures are projected to decrease by more than 10 percent, whereas minimally invasive interventional radiology procedures are expected to increase by nearly 75%. Substantially higher growth than now projected (> 2.5% per year) is likely only if screening imaging (CT scanning and ultrasound) gains much wider use.

By 2009 about 45% of all abdominal aortic aneurysm repair procedures are expected to be endovascular procedures (Chart 2). Notwithstanding the shift to endovascular procedures, vascular surgeons are expected to retain 70% of the AAA repair market. Interventional radiologists are likely to gain a 25% share, and cardiologists about 5%. The principal changes in projected market share reflect the growing interest of interventional cardiologists in a wider array of endovascular procedures and the diffusion of CT and MR angiography capability more widely among medical specialties, particularly among cardiologists.

Chart 2
Abdominal Aorta Aneurysm Repair
2004 - 2009 *(Projected)*

All Cases, 2004 - 2009



Patient Population = ICD9 Codes 3804, 3814, 3834, 3844, 3864, 3884, and CPT Code 75952.
Source: *Future of Vascular Services* , The Advisory Board, 2005, p. 32.

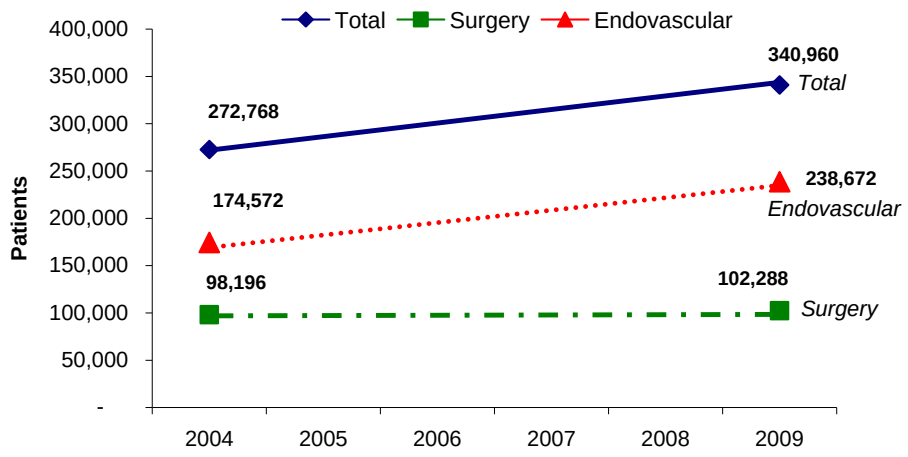
o Peripheral Vascular Disease Diagnosis and Treatment

Peripheral vascular disease (PVD), also called peripheral artery disease (PAD), is a chronic condition characterized by narrowing of blood vessels that carry blood to the brain, legs, stomach, arms, and kidney. The condition affects more than 10 million Americans, with about 1.0 million persons developing symptoms of peripheral vascular disease (PVD) each year.

As with most vascular disease, incidence and prevalence increase with age and vary considerably by gender. It is most common, and prevalence is much higher, among those over 50 years of age. Onset of PVD symptoms often occurs among men after age 50 and among women after age 60. The dominance of males diminishes after age 70, as larger numbers (and percentages) of women become symptomatic. Studies suggest that about 5% of men and 3% of women over the age of 60 have symptoms of PVD.

Chart 3
Peripheral Vascular Disease Procedures
2004 - 2009 *(Projected)*

All Cases, 2004 - 2009



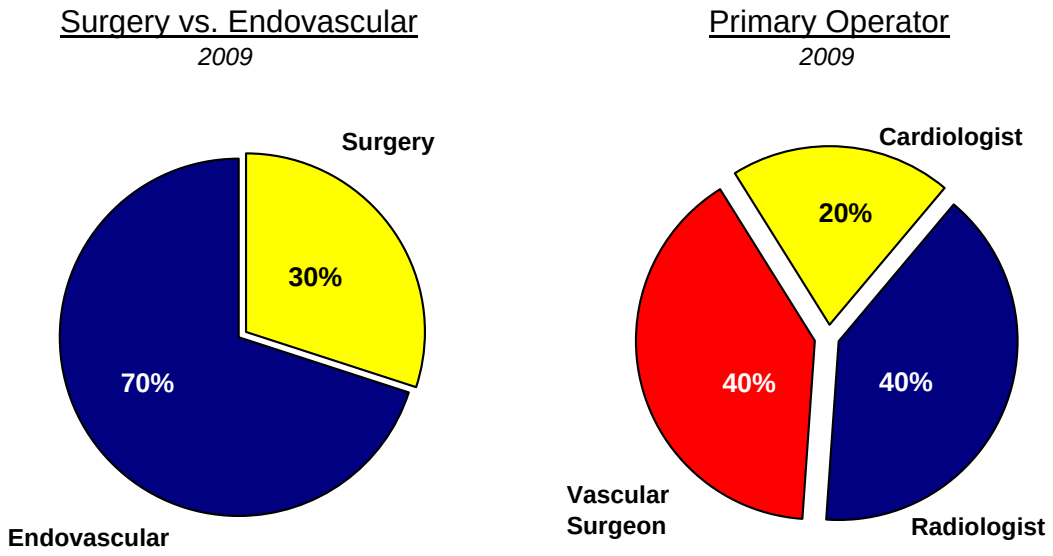
Patient Population = ICD9 Codes 3924, 3925, 3929, 3950, 3990 and CPT Codes 35471, 35473, 35474, 35475, 37205, 75966 and 75992.
Source: *Future of Vascular Services* , The Advisory Board, 2005, p. 58.

More than 70% of patients with peripheral vascular disease show few clinically significant changes after symptoms appear, but between 20% and 30% of patients develop more severe symptoms, which require intervention. The presence of peripheral vascular disease is, in most cases, a sign of systemic atherosclerosis, which puts these patients at higher-than-average risk for cardiovascular morbidity and mortality.

Patients with peripheral vascular disease generated nearly 275,000 interventional procedures, surgery and endovascular interventions, in 2004 (Chart 3). Aggregate

demand is growing steadily, with the endovascular interventions component growing much more rapidly than surgical procedures. Aggregate demand nationally is likely to increase by about one-third by 2010, to between 360,000 and 375,000 procedures.[47] Nearly all of the projected growth is in the endovascular component. By 2010, the endovascular component is likely to increase to about 70-75% of total demand Charts 3 and 4).

Chart 4
Peripheral Vascular Disease Procedures
By Specialty and Type, 2009 *(Projected)*



Patient Population = ICD9 Codes 3924, 3925, 3929, 3950, 3990 and CPT Codes 35471, 35473, 35474, 35475, 37205, 75966 and 75992.
Source: *Future of Vascular Services* , The Advisory Board, 2005, p. 58.

It is evident that peripheral vascular disease will remain a major component of interventional radiology service programs for many years.

For peripheral vascular disease patients that require intervention, angioplasty is the procedure of choice among nonsurgical, endovascular therapies when conservative treatment (lifestyle modifications and drug therapy) fails. Recent advances in the percutaneous treatment of PVD include the introduction of metallic endovascular stents placed within the artery to keep it open and flood flowing. In select patients with acute arterial blockages, intra-arterial thrombolysis (direct administration of clot dissolving drugs) also may be used.

Traditional open surgery for peripheral artery disease is generally reserved for those symptomatic patients who don't respond to more conservative treatments and whose vascular anatomy and arterial blockages preclude endovascular capabilities. Because of

frequent concomitant cerebral and coronary vascular disease, the risks of post-operative morbidity and mortality (e.g., stroke, heart attack) are significant for PVD patients who require open surgery.

Demand for PVD treatment is projected to continue to grow substantially throughout the decade. Average annual growth is projected to be about 5 % for the next several years, with nearly all of the growth in endovascular procedures. Surgical procedures are expected to grow by less than 1% annually, compared with more than 7% annual growth for minimally invasive endovascular procedures.

By 2009, endovascular procedures are expected to represent about 70% of the peripheral artery disease interventional procedure market. Vascular surgeons are expected to retain about 40% of the market, interventional radiologists about 40% and cardiologist about 20% (Chart 4).[48]

3. Interventional Neuroradiology

Interventional neuroradiology (INR), also referred to as endovascular surgical neuroradiology by some, originated in the 1980s from collaborative efforts of radiologists and neurosurgeons. The specialty has changed rapidly over the last decade and a half. As with interventional radiology generally, interventional neuroradiology is possible because of advances in computer technology and innovations in medical devices. Essentially, interventional neuroradiology therapies entail the insertion of thin catheters (micro-catheters) into blood vessels, usually in the groin, and threading the catheter under imaging guidance (e.g., fluoroscopy, CT scanning) through the blood vessels leading into the brain. In place, the catheter becomes the channel through which a number of diagnostic and therapeutic agents are introduced and activated.

Minimally invasive INR procedures, now undertaken to treat a number of cerebrovascular lesions and conditions, is a rapidly developing field. Common cerebrovascular conditions now evaluated and treated with minimally invasive endovascular techniques include: brain aneurysm, brain arteriovenous malformations (AVMs), head and neck tumors, stroke, vasospasm, mningioma, intracranial atherosclerosis, vertebral body compression fracture, vertebral body tumors, and carotid artery disease diagnosis and treatment. Carotid artery disease treatment illustrates the recent growth and potential of interventional neuroradiology.

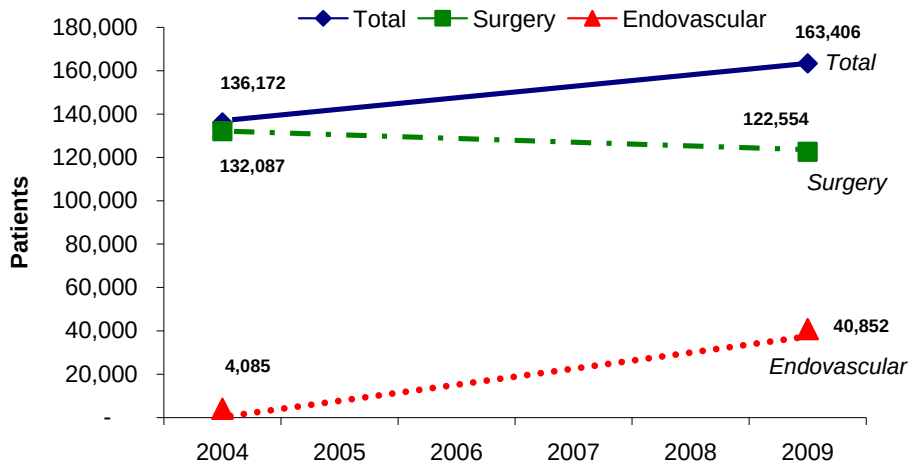
- **Carotid Artery Disease**

Approximately 2.5 million Americans have significant stenosis (narrowing) of the carotid artery. Most of these conditions are asymptomatic. More than 136,000 carotid artery revascularization cases were reported by hospitals in 2004 (Chart 5). Demand is expected to increase significantly over the next decade. This growth will be due in part to population aging and in part from the ability to treat with carotid artery stenting (CAS) a wider array of patients than was (is) eligible for surgical treatment (CEA).

Carotid artery disease is highly correlated with age, increasing steeply among those over 65 years of age. The point prevalence of the condition increase from less than 0.5% for those 60 years of age to about 10% among those 80 years and older.[49] The market for carotid revascularization will expand as carotid artery stenting becomes more widely accepted and used, particularly among those not clinically eligible for coronary artery surgery and among asymptomatic patients with moderate to severe artery narrowing. These factors are expected to result in an increase in aggregate demand of approximately 25% by the end of the decade (Chart 5).[50]

Chart 5
Carotid Artery Disease Diagnosis and Treatment
Surgery vs. Endovascular, 2004 - 2009 *(Projected)*

All Cases, 2004 - 2009



Patient Population = ICD9 Codes 3802, 3801, 3812, 3842, and 3862.
Source: *Future of Vascular Services* , The Advisory Board, 2005, p. 54.

Carotid artery stenting (CAS) has a number of benefits over carotid artery surgery (carotid endarectomy or CEA):

- A local anesthetic can be used for CAS, as opposed to the general anesthesia that is used for CEA. In addition to reducing the risk associated with anesthesia, the use of a local anesthetic enhances patient comfort and allows the interventionist to monitor the patient's clinical status.

- CAS requires no incision in the neck, which reduces the associated risks, including damage to nerves, vocal cord or trachea and wound infections. These types of complications occur in approximately 5 percent of surgery cases.

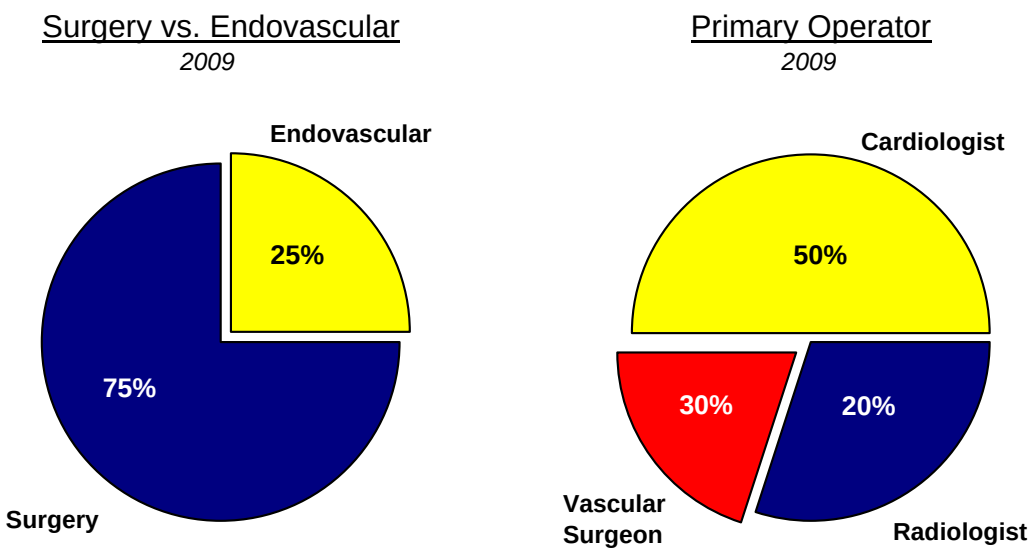
- Stenting can be performed on some high-risk patients who because of co-morbidities typically would not undergo open surgery.

- Though costly, stent procedure aggregate costs are less than the cost of open surgery. Stent patients have a shorter average length of stay and have less need for intensive nursing care than CEA patients.[51]

Although less traumatic and risky than open surgery, there are significant risks and costs associated with the CAS. During the procedure, plaque in the carotid artery is compressed under the stent, rather than removed as in surgery. Because the plaque is not removed, there may be an increased need for future revascularization in arteries that have been stented. There is a risk that emboli (small clots) will be dislodged during the procedure, travel to the brain and cause a stroke, leading to disability or death. These risks increase with age. As a new technology, the durability of stents, restenosis rates, and long-term rates of subsequent strokes are not known.

Chart 6 shows the projected distribution of carotid artery disease diagnosis and treatment procedures between the two principal modalities by the end of the decade, and the likely distribution among the three medical specialties competing to serve patients.

Chart 6
Carotid Artery Disease Diagnosis and Treatment
By Specialty and Type, 2009 *(Projected)*



Patient Population = ICD9 Codes 3924, 3925, 3929, 3950, 3990 and CPT Codes 35471, 35473, 35474, 35475, 37205, 75966 and 75992.
Source: *Future of Vascular Services* , The Advisory Board, 2005, p. 32.

Several other professional societies have issued statements with similar planning and service development recommendations. The American Academy of Neurology (AAN), American Association of Neuroradiological Surgeons (AANS), American Society of

Interventional and Therapeutic Neuroradiology (ASITN), and Society of Interventional Radiology (SIR) released a consensus statement recommending that the interventionist should complete at least 200 cerebral angiograms during training because, as the preferred tool used to determine the level of stenosis (artery narrowing), the ability to do angiograms is inherently linked to CAS proficiency.[52]

Initially, carotid stenting is likely to be used for carotid revascularization in older, sicker patients who are not candidates for open surgery. As clinical trials that focus on comparing CAS to CEA in low risk populations are completed, stenting is expected to replace most CEA. Many of these trials are expected to produce results by 2008. Conservative estimates are that stenting will grow to about 25% of the carotid artery revascularization market within the next few years and to between 50% and 75% of the market within a decade.[53]

4. Mississippi Circumstance and Needs

Unlike with cardiac catheterization, there is no repository or other reliable source of data that would permit an accurate analysis of interventional radiology service demand or to project future need (expressed demand). Both interventional radiology and nueroradiology encompass a number of distinct diagnostic and therapeutic procedures, including a variety of endovascular procedures. Until better data collection and reporting systems are in place, planning will depend on identifying the type (array) of procedures likely to be performed and examine use levels and rates for each individually.

This was done for a set of selected neuroradiology procedures identified by diagnosis, procedure, and payment codes. This analysis indicates that a population of the size and composition of Mississippi's would be likely to generate aggregate demand (primary and secondary diagnoses) for between 6,500 and 8,400 inpatient neuroradiology procedures described by these codes annually.

The nature and history of interventional radiology and neuroradiology services are such that steep increases in demand (from a comparatively small patient base) are common and are not necessarily indicative of expected future rates of growth at those levels. Increases in demand for these services tend to follow a pattern of "punctuated equilibrium," with short sharp increases followed by plateaus. Demand is also subject to sharp changes in program personnel (especially key physicians) and other external factors.

- ***Interventional Laboratory Development Considerations***

Growth and differentiation of interventional procedures as distinct service lines led to the development of separate and dedicated laboratories for cardiac catheterization and interventional radiology, and more recently neuroradiology in some facilities. An American Heart Association task force promulgated professional guidelines and standards for interventional laboratories in 1993.[54] The task force found that interventional peripheral and visceral vascular procedures had evolved to the point that

distinct dedicated laboratories may be warranted: "the equipment and personnel requirements are unique and distinct from the requirements of a dedicated cardiac catheterization laboratory or neuroradiology facility."[55] The guidelines contain recommendations on laboratory design (layout), size, location, staffing, environmental control, and related characteristics. They recognize that, although some aspects of laboratories can and should be standardized (e.g., aseptic control, radiation exposure precautions), most design, size, and staff complement aspects of the laboratory depend on the intended use, principally the type and number of procedures to be performed.

Developers and operators of cardiac catheterization, interventional radiology, and neuroradiology laboratories generally follow these recommended guidelines and standards. Where service volumes are adequate, most cardiac catheterization laboratories provide only cardiac procedures, with other interventional procedures provided in special purpose laboratories. Given the limited resources and the specialized personnel required, there are relatively few dedicated neruroradiology laboratories.[56] Nevertheless, where the resources are available and service volumes sufficient, dedicated neuroradiology laboratories are being established. Most are in academic medical centers or in large regional referral hospitals with comprehensive stroke centers. Consequently, outside of these centers, most neuroradiology procedures are performed in multi purpose interventional laboratories, cardiac catheterization laboratories, and modified surgical suites.

- **Evolving Environment**

Although the interventional radiology guidelines are less than five years old, rapid technological change is overtaking the assumption that cardiovascular, interventional radiology, and neurological procedures be performed in separate dedicated rooms. A leading authority believes that because surgical and interventional procedures are converging there is a need to "share spaces that have been separate and uniquely designed."[57]

Most existing surgical suites cannot accommodate easily the advanced imaging equipment and the larger number of specialists (technicians and physicians) that may be necessary for many cases. Existing special procedures rooms usually are not designed with the environmental controls or traffic patterns required for many invasive procedures. Consequently, separately designed and located interventional procedure rooms and surgery suites are expected to give way to "integrated interventional platforms," which would reflect a more flexible and adaptable environment where

- Surgeons, radiologists, cardiologists and technologists can work cooperatively as integrated teams;
- Costly equipment and space can be shared, rather than duplicated; and
- Infrastructure design accommodates the rapid medical technology changes associated with procedure-oriented medicine.[58]

Given rapid technological change and a projected useful life of five to seven years for most interventional laboratory technology, these are considerations that need to be weighed carefully when new services are established and new space developed. All of these factors and related considerations should be considered before stand alone interventional laboratories are developed.

5. Conclusions and Findings

Interventional radiology refers to minimally invasive medical procedures, many if not most of which are endovascular in nature, and are provided under imaging guidance. Typically, they provide definitive treatment as they obtain and confirm clinical information in real time.

Broadly defined to include neuroradiology and imaging guided minimally invasive surgery, the interventional radiology market is large, diverse, and growing rapidly. It includes an array of procedures that range widely in terms of complexity, risk, and cost. Interventional radiology has grown rapidly because it offers significant medical and economic advantages: less risk, pain, and recovery time; shorter hospital stays; substantial reliance on endovascular techniques that permit treatment of some conditions and patients otherwise untreatable; and less aggregate (total) expense.

Reliance on, and demand for, interventional radiology procedures is expected to continue to grow steadily. There are a number of interventional radiology technologies and devices in early stages of diffusion to the medical community and many more in various stages of development. Increased demand is likely to come from increasing prevalence of the age-related chronic conditions treated successfully with endovascular procedures, earlier and more reliable identification of conditions susceptible to interventional radiology treatment, and technological advances in percutaneous endovascular capabilities.

Most interventional radiology procedures continue to be performed in multi purpose "special procedures rooms" (laboratories). These rooms often are used for cardiac catheterization, diagnostic anteriography, and therapeutic interventional procedures, depending on the hospital's size, resources and patient population. Growth and differentiation of interventional procedures as distinct service lines has led to the development of separate laboratories for cardiac catheterization and interventional radiology, and more recently for neuroradiology, in many hospitals, particularly larger facilities.

Until recently, most professional laboratory planning guidelines have held that, although some aspects of interventional laboratories can and should be standardized (e.g., aseptic control, radiation exposure precautions), most design, size, and staff complement aspects of the laboratory depend on the intended use, principally the number and type of procedures to be performed.

Developers and operators of cardiac catheterization, interventional radiology, and neuroradiology laboratories, heretofore, generally have followed theses guidelines and

principles. Where service volumes are adequate, most cardiac catheterization laboratories provide only cardiac procedures, with other interventional procedures provided in separate special purpose laboratories.

Given the limited resources and the specialized personnel required (approximately 300 credentialed neuroradiologists nationally) there are relatively few neuroradiology laboratories. Where the resources are available and service volumes sufficient, dedicated neuroradiology laboratories are being established. Most are in academic medical centers or in large regional referral hospitals with comprehensive stroke centers. Consequently, most neuroradiology procedures are performed in multi purpose interventional laboratories, cardiac catheterization laboratories, and modified surgical suites.

Innovation, technological advances, and changing clinical practice are leading to a convergence of medical imaging and surgery services and to the merging of diagnostic and therapeutic procedures. In general, much surgery is becoming less invasive and medical imaging is becoming more interventional. Similarly, increasing percentages of surgical procedures are undertaken more effectively and efficiently with the benefit of state-of-the-art imaging guidance.

Most operating rooms cannot accommodate the advanced imaging equipment and/or the number of specialists necessary for many imaging guided cases. Similarly, traditional imaging procedure rooms do not provide the environment needed to control the flow of materials, supplies and people or the air quality required for invasive procedures. Consequently, the function, design, and location of surgical suites and interventional laboratories, and their relationship to other services, are being reexamined.

Separately designed and located interventional procedure rooms and surgery suites are expected to give way to "integrated interventional platforms," which provide a more flexible and adaptable environment that permits sharing of equipment and space, promotes cooperation and collaboration among medical specialists, and facilitates accommodation of rapid changes in medical technology.

The blending of surgery and imaging technique and procedures is most evident in interventional radiology procedures such as peripheral radiographic angiography and neuroangiography, and in interventional cardiology procedures such as PCI. There are, however, a number of other therapeutic catheter-based endovascular and endoscopic procedures that involve use of image guidance and are likely to be performed best in fully integrated interventional laboratories.

Universal interventional laboratory design offers the opportunity to break down department and specialty boundaries that limit service integration and operating efficiency. Given rapid technological change and a projected useful life of five to seven years for interventional laboratory technology, these are considerations that need to be weighed carefully when new services are established and new space developed. Cardiac catheterization, interventional radiology, and neuroradiology can be (and are) performed in the same laboratory. Where service volumes are sufficient, separate dedicated

laboratories can be (and are) operated efficiently and effectively. There is considerable evidence that state-of-the-art integrated interventional laboratories should be considered when new laboratories are developed. All of these factors and related considerations should be weighed carefully before "stand alone" interventional laboratories of any kind are developed.

Unlike cardiac catheterization, comparatively little interventional radiology data is consistently reported, gathered and analyzed. There is no reliable, readily accessible set of data that can be used to determine accurate use rates, much less project future demand, for the field as a whole. Service and procedure specific projections of need are required to determine procedure caseload and laboratory capacity needs.

Although the data needed to project future demand for interventional radiology, or specifically neuroradiology, capacity is not readily obtainable, the information that is available suggest that Mississippi's population would be likely to would be likely to generate aggregate demand for more than 6,500 neuroradiology procedures annually.

It is prudent to begin developing planning standards and protocols for these emerging services and to begin to collect the data and information required.

6. Recommendations

Data Collection: Establish protocols for collecting needed interventional radiology resource and use data for both inpatients and outpatients by type (procedure code or other indicator) and zip code or other discrete geographic descriptor.

Planning Criteria and Standards: Criteria and standards for determining need for interventional radiology services should be added to Mississippi State Health Plan. Attachment 1, Appendix C contains a draft set of criteria.

D. *Radiation Therapy*

1. Background: National Patterns and Trend

Radiation therapy, which entails the exposure of tumors to high-energy radiation, is one of the commonly used treatments for cancer. Surgery and chemotherapy (drugs) are the other frequently used treatment modalities. Hormone therapy and immunotherapy are used less often. The large majority of radiation therapy patients, more than 95%, receive externally generated doses of ionizing radiation during short outpatient treatment sessions. The devices used most often to deliver the radiation are linear accelerators (LINACs). They generate beams of high-energy radiation that can be shaped, targeted, and modulated with increasing precision.

Therapeutic radiation may be used alone or in combination with one or more of the other treatment modalities. In the majority of cases, radiation therapy is used in conjunction with surgery and chemotherapy. External beam radiation usually follows surgical removal of cancerous tissue. It may be used in an attempt to cure the disease by destroying all detectable cancerous tissue (cells), or as a palliative where a cure is not likely or possible. Palliative radiation therapy is usually undertaken to shrink the size of tumors, and to reduce pain and other symptoms of the disease. In curative therapy, patients normally receive five treatments per week (one per day) for a period of six or seven weeks. Palliative treatment usually consists of daily treatment for one to two weeks. There may be a second, shorter course of treatment, after an interval to assess results of the first course, for both curative and palliative treatment series.

Radiation therapy is part of the treatment regimen for between 50% and 60% of all cancer patients. Most patients receive an initial course of 25 to 35 treatments. Some begin their radiation treatments while inpatients at a hospital, but most treatments are provided to outpatients. Because of the number of treatments most patients receive, because most treatments are provided to outpatients, and because of the difficulties some patients have in traveling to receive care, convenient access to a service is a major concern.

Exposure to ionizing radiation entails risk. State-of-the art technology and treatment planning are important considerations in radiation therapy to minimize damage to healthy tissue. Advances in radiation therapy over the last two decades include the shift to intensity-modulated radiation therapy (IMRT) and image guided radiation therapy (IGRT), and the use of computers and CT scanners in treatment simulation and planning. These developments permit more precise delivery of specified doses of radiation with less collateral exposure of healthy tissue to radiation. The integration of intensity-modulated radiotherapy with high-speed helical CT scanners, for example, reduces treatment planning time and permits optimized doses of radiation to be delivered more precisely to target tissue.[59] This enhanced precision permits delivery of radiation to target sites near tissue particularly susceptible to damage from ionizing radiation, making it possible to target some cancers, and treat some patients, previously not referred for radiation therapy.

Linear accelerator based "radiosurgery" is the most recent advance in radiation therapy. It permits the delivery of exceptionally high doses of radiation to lesions, while minimizing irradiation of healthy tissue. Usually referred to as stereotactic radiosurgery (SRS) because of the ability to use multiple beams of radiation delivered simultaneously from various angles, this technology makes it possible to destroy some tumors not amenable to treatment with other techniques. It takes advantage of the capabilities of computers and advanced imaging techniques (e.g., CT scanning) to target and control the high-energy beams used.

SRS technology has evolved to the point that there are now four basic approaches in providing radiosurgery:

Gamma Knife® technology – Gamma knife technology, approved for clinical use by the FDA in 1989, was the first SRS service in general use. Unlike linear accelerators, gamma knives use a radioisotope (Cobalt-60) to produce the radiation beam. It is used to deliver a single high dose of radiation, which consists of about 200 gamma rays targeted to converge at a single point. The nature and structure of gamma knife technology limits it to cranial applications. The technology requires the use of a head frame attached to the skull to prevent head movement during treatment. With slightly more than 100 gamma knives installed nationwide, for more than a decade the technology has been the most frequently used modality to treat brain tumors and noncancerous neurological conditions that can not be resolved surgically. Gamma knife diffusion appears to have reached a plateau. Though it will be used at existing service sites for some time, gamma knife technology is likely to be supplanted by more recently developed forms of SRS.

Cyber Knife® technology – Cyber knife technology, approved by the FDA for intracranial clinical use in 1999 and for extra-cranial use in 2001, differs substantially from gamma knife technology. A cyber knife is a small linear accelerator mounted on a movable robotic arm. The linear accelerator produces the radiation beam. Combined with near real time imaging and targeting, the cyber knife's mobility makes it possible of treat multiple tumors in different locations. Unlike with the gamma knife, the prescribed radiation dose can be delivered in one or several fractions (treatment episodes), and is not limited to intracranial applications. Early indications are that the cyber knife is useful in treating lung, spine, liver, pancreas and prostate tumors that are difficult to treat safely with conventional radiation therapy. Diffusion of cyber knife technology is occurring more rapidly than gamma knife technology. Although approved for clinical use a decade later than the gamma knife, the number of cyber knife systems operational or under development recently exceeded the number of gamma knife installations. Cyber knife growth is likely to continue to outpace gamma knife growth.

Linear accelerator SRS upgrades – Most standard linear accelerators now in use can be modified (upgraded) to permit them to be used to deliver high energy SRS treatments. The upgrades include software and treatment table changes that enable the manipulation of treatment frames and, consequently, more precise positioning of the patient.

Multifunctional linear accelerator technology – Several manufacturers are now marketing linear accelerators capable of performing multi-fraction IMRT and IGRT and hypo-fractionated (single and multiple high does of radiation delivered with "surgical" precision) SRS. There are now five such systems on the market, three of which obtained FDA approval for clinical use between 2002 and 2004. Combined with advanced imaging (CT and MRI scanning), these capabilities permit increased treatment precision and expanded the array of tumors and the numbers of patients eligible for treatment. Multifunctional LINACs are capable of treating the widest range of conditions and lesions and the broader array of patients. Assuming clinical results continue to be favorable, recent experience suggests that multifunctional linear accelerators are likely to capture the large majority of the SRS market. It remains unclear which system is likely to dominate.

Rapid technological change in radiation therapy, including the advent of multiple approaches to SRS, raises the underlying questions of how much SRS capacity is needed, where it should be located, under what circumstances should additional SRS services be authorized, and how the use of SRS may affect overall demand for radiation therapy capacity and systems.

Cancer incidence, prevalence, treatment rates and protocols, and mortality are reasonably well known. In a defined population a predictable, limited number of persons are likely to need radiation therapy each year. Currently, anticipated demand for SRS is limited. Table 3 shows the incidence of intracranial conditions that may benefit from SRS treatment.

Table 3
Intracranial SRS Demand
Estimated Incidence of SRS Treatable Conditions by Type/Condition, 2006

ICD-9 Codes	*Type/Condition*	*Incidence (Rate per Million Persons)*	*SRS Treatable (Estimated Percentage)*	*Estimated SRS Treatable Patients (Rate per Million Persons)*
198.3–198.4	Metastases	630	27%	170
350.1	Trigeminal Neuralgia	43	50%	21
747.81	Arteriovenus Malformations	19	70%	13
191.0–191.9	Malignant Brain Neoplasms	40	25%	10
225.0–225.2	Benign Brain Tumors	20	40%	8
192	Acoustic Neuromas	9	70%	6
227.3	Pituitary Adenomas	21	20%	4
192.1	Cerebral Meninges	8	25%	2
237.0-237.3	Other Neoplasms	4	25%	1
Total		***794***	***30% (1)***	***235***

Source: *Stereotactic Radiosurgery: Clinical, Financial, and Operational Impact of Emerging Technologies* , The Advisory Board Company, 2006, p. 19. (1) Weighted average

Incidence and treatment rates are relatively low. These data indicate that efficient use of a dedicated SRS service requires a large based population or service area, preferably several million persons. Table 4 shows the incidence of extra-cranial conditions that are likely to benefit from SRS treatment. With current capabilities, intracranial procedures represent about one-third of estimated demand. These data suggest strongly that multifunctional SRS technology is likely to prove better suited to meeting projected demand efficiently in most communities.

Each SRS system has its proponents and partisans, and each manufacturer aggressively promotes its product. It is not possible to say which system or technology is best or, perhaps more importantly, which system will prove to be most compatible with future technological developments.[60] What does seem evident is that the linear accelerator based SRS systems represent state-of-the-art radiation therapy technology. They incorporate advanced computer, imaging, and robotic technologies. In most cases, they can be used to treat tumors and other malformations throughout the body. Perhaps more importantly, they incorporate technologies that attempt to compensate for both voluntary and involuntary body motion and achieve near "real time" target (tumor) identification and dose delivery. More precise targeting and dose delivery make it possible to treat some tumors heretofore unreachable. Unless one assumes that there will not be additional significant advances in the technologies (computers, imaging, robotics) these systems rely upon, they appear to point the way to the future.

Given the current number and locations of radiation therapy programs in the region, the age and life cycle of the linear accelerators now in use, the ongoing evolution of radiation therapy technology, regional population distribution and growth patterns, and cancer patient distribution and medical trade patterns, the appropriate way to guide the expansion of SRS services is to encourage replacement of existing linear accelerators with new state-of-the-art accelerators with SRS capability as the older units reach the end of their useful life.

Reversing a long trend upward, age-adjusted cancer incidence and mortality have been decreasing since the early 1990s. These changes appear to result from reduced tobacco smoking rates and concerted efforts to diagnose and treat cancers earlier. These efforts have contributed to the increasing five-year survival rates for many cancers. The five-year survival rate for all cancers combined now exceeds 60%, and is substantially higher for a number of cancers (e.g., colorectal and breast) when diagnosed early. It is unclear how the decreasing cancer incidence and increased reliance on SRS treatment will affect demand for radiation therapy over the next decade. At least in relative terms, both are likely to reduce aggregate demand. To the extent SRS becomes an alternative to open surgery, and hypo-fractionated treatment (delivery of the prescribed dose of radiation in a smaller number of treatments (e.g., 1-5 treatments), it is likely to result if fewer treatment sessions. In contrast, population growth, population aging, and the ability to treat a larger percentages of the tumors identified are likely to increase demand, at least marginally. Effective planning for radiation therapy services will require monitoring of these trends and the controlled introduction and diffusion of SRS capability.

Table 4
Extra-cranial SRS Demand
Estimated Incidence of SRS Treatable Conditions by Type/Location, 2006

ICD-9 Codes	*Organ/Site*	*Incidence (Rate per Million Persons)*	*SRS Treatable (Estimated Percentage)*	*Estimated SRS Treatable Patients (Rate per Million Persons)*
170.2,170.6, 171.9, 181.7, 192.2, 192.3, 198.3, 198.4, 225.3, 225.4, 237.5, 237.6	Spine	34	50%	17
157.0 - 157.9, 211.6, 230.9, 235.5	Pancreas	111	75%	83
155.0, 155.2, 197.7, 211.5, 230.8, 235.3	Liver	61	45%	27
162.2 - 162.9, 197.0, 212.3, 231.2, 235.7, 239.1	Lung	595	28%	167
185, 189.3, 222.2, 233.4, 236.5	Prostate	800	50%	400
189.0, 189.1, 198.0, 233.0, 236.91	Renal	125	30%	27
Total		***1,726***	***42% (1)***	***732***

Source: *Stereotactic Radiosurgery: Clinical, Financial, and Operational Impact of Emerging Technologies* , The Advisory Board Copmpany, 2006, p. 21. (1) Weighted average

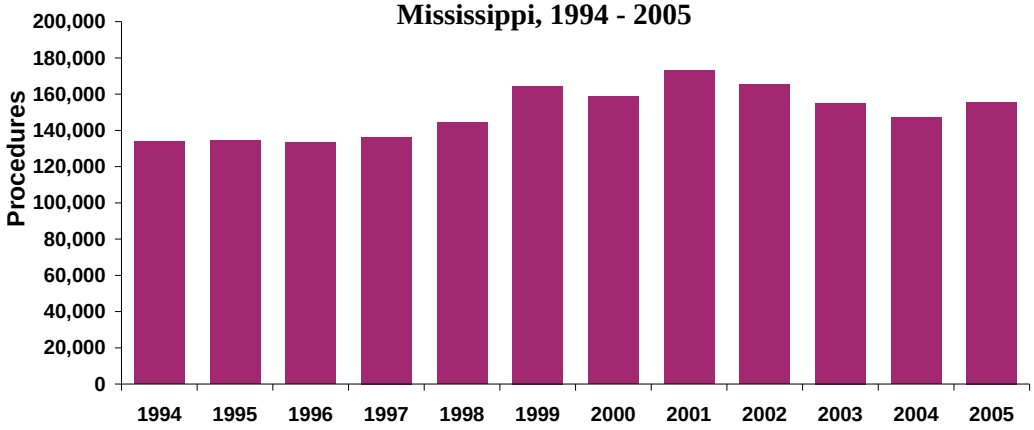
To date, SRS has benefited from extraordinary high reimbursement levels from Medicare and other insurers. Reimbursement for a single treatment may be as high as $6,700, with total payment for those receiving multiple treatments (up to 5 treatments) reaching more than $20,000 per patient. Compared with early reimbursement for other costly advanced medical technologies (e.g., PET imaging), these payment levels are anomalous. They are likely to be reduced as the service becomes more widely available and used in routine therapy. Arguably, greater reliance on SRS treatment for selected cancer patients holds out the prospect for more effective and less costly cancer care.

2. Mississippi Experience

As with many chronic conditions, Mississippi has relatively high cancer incidence, prevalence, and mortality. In recent years the overall state cancer mortality rate has been about 11% higher than the national rate. About 15,000 new cancer cases are diagnosed each year in Mississippi and more than 6,000 cancer deaths reported. Cancer mortality rates have been decreasing in Mississippi, but not a rapidly as in most other states.

There is wide variation and disparity in cancer incidence and mortality among counties and along racial lines, with increasing rates in some counties. The most recent assessment of the burden of cancer in Mississippi concluded that “marked racial

Chart 7
Therapeutic Radiation Procedures
Mississippi, 1994 - 2005



Source: Mississippi State Department of Health , 2007.

disparities exist in cancer mortality throughout the state," and that there is a "considerable amount of cancer mortality is premature, especially among non-whites."[61]

As is the case nationally, cancers of the lung, breast, colon, and prostate are the most frequently diagnosed cancers in Mississippi. The Mississippi age-adjusted mortality rates from all four cancers are higher than the comparable national rates. The greater disparities are in prostate and lung cancers, where the Mississippi rates are respectively 25% and 37% higher than the national rates. It may be noteworthy that prostate and lung cancers are among those for which SRS treatment shows promise (Table 4).

Radiation therapy services are available throughout Mississippi. There are 21 treatment centers with more than 30 linear accelerators. Nearly half of the service sites, 9 of 21 centers, are freestanding treatment centers. There is at least one service and two linear accelerators in each of the seven acute care hospital planning districts. There is one Gamma Knife® service. Average use of existing linear accelerators is not high, about 5,100 treatments per unit in 2005. Very few centers have aggregate service volumes that meet the service volumes called for in the State Plan.

Recent radiation therapy service volumes use rates indicate that therapeutic radiation use levels are somewhat lower than in many peer states, and somewhat lower than the use rate assumptions incorporated in the State Health Plan need determination methodology. The total number of radiation therapy treatments has ranged between approximately 140,000 and 160,000 over the last decade (Chart 7). These volumes translate into a use rate of between 50 and 55 procedures per 1,000 persons.

The review criteria and standards used to assess proposals to develop and expand radiation therapy services are similar to those used in most other states. The service

volume standards, 320 new cancer cases and 8,000 radiation therapy treatments per year, incorporated in the need projection method are comparable to those in place in peer states and elsewhere. The principal difference in the Mississippi methodology and the methods used in most peer states is the inclusion of a population ratio factor (one therapeutic radiation therapy unit per 148,148 persons). As noted in the 2006 AHPA report, the derivation and application of this consideration is not problematic.

As in a number of peer CON states, the emergence of stereotactic radiosurgery (SRS) technology in not considered in the plan. The Plan does contain standards for Gamma Knife® development and use. This is the only form of SRS technology referenced. The plan does not address SRS in the form of Cyber Knife® systems or other linear accelerator based SRS systems.

3. Conclusions and Findings

Until recently, SRS was used largely to treat brain tumors and other cranial abnormalities. Increasingly, it is being used to treat tumors and other lesions in a number of organs and tissues. Equipment manufacturers are now integrating SRS capabilities into most new linear accelerators. The lines between SRS and conventional radiation therapy are beginning to blur. The fundamental distinction between the two approaches is that extra-cranial SRS is delivered in only a few treatment sessions (referred to as fractions) over a much shorter period of time, whereas conventional radiation therapy is delivered over a longer period of time in a larger number of lower dose fractions.

Much of the interest in extra-cranial SRS results from its potential to treat tumors of the spine and critical organ systems that are untreatable with conventional means. In addition, as clinical evidence of success grows, some patients and clinicians are likely to opt for SRS over conventional radiation therapy because it is delivered in fewer fractions over a much shorter period of time. SRS offers reduced procedure time, a short (or no) hospital stay, and significantly reduced recovery time. Current estimates of the likely application of SRS indicate that about 3,000 SRS procedures might be generated statewide over the next three to five years, more than two-thirds of which would be extra-cranial procedures.

Under current reimbursement arrangements, radiation therapy is an unusually profitable service. This is especially true for SRS. At current payment levels, breakeven caseloads range between 100 and 150 cases per year, depending on the equipment used and the number of fractions used to deliver the prescribed radiation dose. Even though the demand (need) for SRS is relatively low, the potential to expand total radiation therapy caseloads with heretofore untreatable patients and for substantial economic returns is likely to increase interest in introducing SRS services.

There is more than adequate radiation therapy capacity statewide to meet demand. In aggregate terms, there is no indication that additional liner accelerators will needed for many years. Given the lifecycle of radiation therapy equipment, it is likely that most CON proposals seen over the next decade will focus on equipment upgrades involving

the acquisition of Cyber Knife® or multifunctional linear accelerator based SRS technology. Criteria and protocols for assessing the need for these technologies and services should be incorporated in the State Health Plan.

The criteria and standards used to assess applications for Gamma Knife® services are appropriate and reasonable. No more than one service is required statewide.

Stereotactic radiosurgery (SRS) is the most recent advance in radiation therapy. It is distinctive in that it entails the use of a high-intensity, precisely focused energy beam to deliver a high dose of radiation designed to destroy tumors and other lesions with one exposure (treatment), or in some cases between two and five treatment fractions.

Multifunctional linear accelerators can be used to treat both intracranial and extra-cranial lesions. In addition, the ability to perform three dimensional conventional radiation therapy, IMRT, and IGRT distinguishes these treatment modalities from the standard conventional linear accelerator. This versatility enables multifunctional LINACs to treat a wider range of patients and potentially operate more efficiently. These systems are likely to be the equipment of choice.

Recent and prospective advances in the technologies that underlie the development of more sophisticated linear accelerator based radiation therapy systems suggest that relatively soon all radiation therapy programs will be expected to incorporate SRS capability. Current and projected need for SRS indicates that demand could be met by one system in all but the largest communities.

4. Recommendations

Data Collection: Establish protocols for identifying existing SRS capable radiation therapy systems and monitoring future SRS resources and service volumes.

Data Analysis: Conduct analysis of discrete radiation therapy use to determine intrastate variation (variation by planning district) in the percentage of diagnosed cancer patients that receive radiation therapy and in the numbers of treatments provided.

Planning Policy: Planning policies governing radiation therapy services should be revised to indicate that

a. The introduction and diffusion of SRS technology will be controlled by favoring the replacement obsolete conventional linear accelerators with multifunctional linear accelerators incorporating SRS capability;
b. For regional planning purpose, a Cyber Knife® will be considered a multifunctional linear accelerator; and
c. Should results of the data analysis warrant, the formula used to project need for radiation therapy services should be revised to reflect the actual percentage of diagnosed patients referred for radiation therapy and the actual number of treatments provided.

E. Magnetic Resonance Imaging

1. Background: National Patterns and Trends

Magnetic resonance imaging [MRI] is a noninvasive diagnostic imaging technology that uses magnetic fields and radio waves to produce images. MRI is similar to computerized tomography (CT) in that it, too, is a rapidly growing noninvasive (or at least minimally invasive) imaging technology of increasing clinical value. MRI scanning differs from conventional radiology (X-rays, fluoroscopy) and CT scanning in that no ionizing radiation is used. It produces detailed images of many soft tissues and structures not easily seen with other imaging modalities.

MRI scanning has proven its value as a diagnostic and a treatment-planning tool in a wide array of clinical applications and in a number of medical disciplines. Its use is now the standard of medical practice for a number of clinical conditions. The number of clinical applications in which MRI scanning is useful, and in which it is used in conjunction with and complementary to other advanced diagnostic and treatment technologies, are increasing. The large majority of MRI patients, more than 90% in most communities, are outpatients.

MRI has been the subject of considerable debate in recent years, not only because of its rapidly expanding medical applications and use, but also because of its high cost and rapid diffusion across the healthcare system.[62] MRI scanners are expensive and have relatively high operating costs. Initial capital outlays of between one and two million dollars are common. Procedure charges range from several hundred to more than a thousand dollars per scan.

Diagnostic imaging services, especially MRI, are in an extraordinary period of growth. Rapid technical advances, growing clinical applications, and accumulating clinical experience have combined to produce soaring demand and a development boom. In most communities, MRI scanning is one of the most profitable services offered, both within and outside of community hospitals. In most cases, MRI scanning has one highest rate of return on investment among freestanding diagnostic and treatment centers. In recent years, demand has grown at an average annual rate of between 10% and 15% in many communities. This trend is expected to continue, but at a lower rate of growth.

Experience in planning for MRI services dates from the mid-1980s. The principal planning goal during the first five years, following introduction of the service in the early 1980s, was to try to calibrate the diffusion of the new technology, to ensure that it was located where it was needed most and would be used most efficiently. These locations were largely community hospitals, initially regional referral centers with large service areas.

The planning environment became more permissive in the late 1980s, just as MRI scanning was becoming established. These circumstances led to the development of marginal imaging programs. The number of MRI scanners quickly increased several fold

in many communities. Supply soon exceeded demand. Operating efficiency declined and total and unit capital costs increased. The principal planning objective during this period was to compensate to the extent possible for the skewed service development pattern and the rapid buildup of surplus capacity. In many communities, it took nearly the entire decade of the 1990s to reduce the surplus.

Unusually rapid growth in MRI demand began in 1999 and has continued over the last five years. MRI service volumes have more than doubled during this period. Improvements in technology have produced higher speed scanners with much better multidimensional images and faster scan times. This has permitted broader clinical application of MRI imaging and increased operating efficiency.

MRI scanner efficiency and throughput, as measured by system capacity, increased significantly over the last decade. Recognizing broader clinical applications, the technological changes underway, the extraordinary growth in demand, and the economic and system shaping implications of this growth, current planning tasks are to calibrate supply and demand and promote system stability and equity. The appropriate balance between hospital-based imaging services and freestanding centers has emerged as a major planning concern.[63]

2. Mississippi Experience

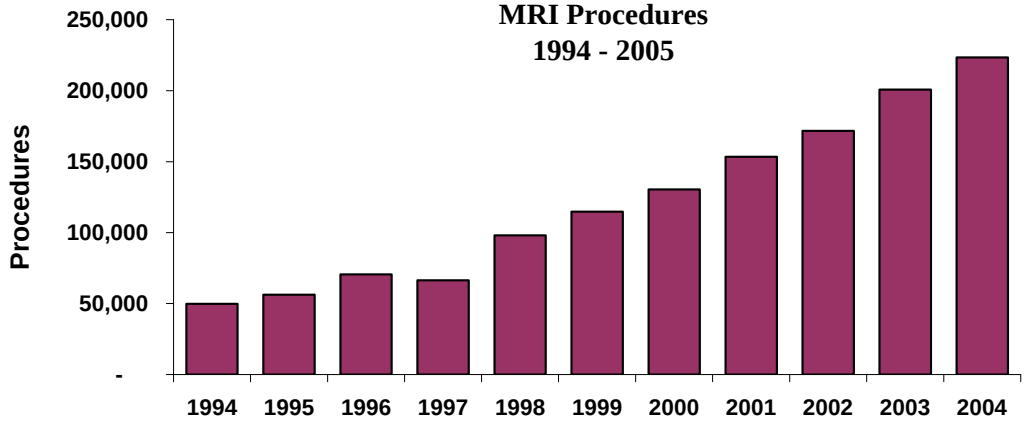
Development of MRI scanning services in Mississippi has followed the national pattern and trend. As with CT scanning, the ratio of MRI scanners to population usually has been higher in Mississippi than nationally.[64] Between 1987 and 2000, for example, the national ratio of hospital-based MRI scanners per 1,000 persons increased at a rate of about 11%. The increase in Mississippi was nearly 14%. In 2000, the ratio of hospital based MRI scanners in Mississippi, 10.2 scanners per million, was more than 20% higher than the national rate of 8.3 scanners per million persons.

Indexed to the national norm, the ratio of MRI scanners to population in Mississippi has averaged more than 20% higher than the national ratio for more than a decade.[65] In 2002, Mississippi had 56 MRI service sites, 49 (88%) of which were hospital based. This represents one of the higher percentages (6th highest) of hospital-based markets nationwide. The comparatively small percentage of freestanding MRI centers may help explain the somewhat lower Mississippi use rate even though it has had a higher than average number of MRI scanners. In 2002, the Mississippi MRI use was about 66 scans per 1,000 persons compared with a national rate of about 76 scans per 1,000. As shown in Chart 8**,** the Mississippi use rate has increased steadily for the last decade, reaching about 78 scans per 1,000 persons in 2005.

The geographic distribution of MRI services appears reasonable, given the current number of MRI scanners and the demography and geography of the state. There are, of course, rural areas where access to MRI scanning is more limited than in urban areas, but given the relatively high capital expenditure review threshold for MRI scanners and other medical equipment subject to regulation, and the other exemptions from CON review

(e.g., conversions of part-time mobile service sites to fulltime fixed site services), it is evident that CON regulation has not been a significant barrier to establishing MRI scanning services in Mississippi.

Chart 8
Mississippi Inpatient Utilization
MRI Procedures
1994 - 2005



Source: Mississippi State Department of Health, 2006.

A unique feature of the Mississippi CON program is the provision that exempts conversion of mobile services to fixed site services, provided the project does not have some other feature that requires review. Under this provision an entity that cannot meet the planning standard for a fixed site fulltime service, for example, can submit an application that proposes part-time use of a mobile MRI. Once approval of a service site is obtained, a service provider can replace its use of the mobile service with a fixed MRI. This is usually done with notice to MSDH in the form of a request for a declaratory ruling from the CON program that the change is not subject to review. The Department handles a large number of declaratory rulings, a large percentage of which are for MRI and other mobile services. There are many part-time mobile service sites. About 12% of MRI scans statewide are provided at part-time mobile services.

Existing planning standards and procedures give preference to applications for mobile service joint ventures and shared services. The practice of permitting existing mobile service sites to convert to fixed service sites outside of CON review is problematic, and is not limited to MRI or other diagnostic imaging services. This provision eliminates review of a substantial number of medical equipment projects. It also generates considerable uncertainty and instability. In addition, it raises fairness and equity considerations. Consideration should be given to considering conversion of a mobile service to a fixed site service to be the establishment of a new service requiring review and CON approval.

Determining the MRI capacity needed, and the optimal number and location of the service sites, is difficult. The current need determination method is based on hospital diagnosis related group (DRG) disease classification system that includes service site or service provider CT scanning volume as an element. The need formulae also incorporate a minimum service volume requirement of 1,700 scans per scanner per year. This method appears to date from a time when there was relatively little operational experience with MRI scanning. Most states that regulate MRI services have dropped use of other diagnostic imaging service volumes as useful predictors of MRI need or demand. Moreover, as the clinical utility of MRI scanning has grown, the reliability of diagnosis related forecasting models has decreased.

With continuing technological advances, average MRI scan times have decreased substantially. Earlier planning estimates of nearly an hour per procedure have been reduced to 30 minutes and less for the large majority of procedures at most service sites. Technological advances have nearly doubled the effective capacity of state-of-the-art MRI scanners over the last decade. Where demand is sufficient, many MRI scanners routinely perform between 5,000 and 7,000 scans annually. The marginal unit cost of MRI scans decreases greatly as the average annual volume increases. Consequently, several states have raised service volume planning standards substantially.

3. Conclusions and Findings

Clinical value and reliance on MRI scanning have grown dramatically, nationally and in Mississippi, over the last decade. Growth in MRI demand in Mississippi has paralleled that seen nationally. Demand and use levels now approximate national averages. MRI services are available in all planning districts and intrastate use levels appear to be generally comparable among the districts. Intrastate variation in service availability and use in Mississippi appears to be lower than interstate variation nationally. There is no evidence that CON regulation has limited access to MRI services.

Under current payment arrangements, MRI is an unusually profitable service. Concerns have been raised nationally about over use (and misuse) of MRI. Revenue and operating margin gained from MRI scanning are critical to the economic stability and viability of acute care community hospitals. There is significant value in maintaining CON coverage of MRI. If there is to be equity—a level playing field—acquisition of all MRI equipment, new services and equipment additions to existing services, should be subject to CON review. The policy and practice of exempting replacement MRI scanners for CON review appears to be working well and should be continued.

4. Recommendations

Minimum Service Volume: Given the technological advances in MRI scanning, and the doubling of effective MRI capacity and throughput over the last decade, the minimum service volume planning standard should be increased from 1,700 scans to 3,500 scans per year for mobile services and fixed site services in rural areas. The minimum volume for urban fixed site services to 4,500 scans per year.

Need Determination Formula: The current need determination formula appears to be dated. It should be replaced with a population based formula based on historical and projected use rates by planning district and by service area where patient origin data are available to permit service area identification and analysis.

F. Positron Emission Tomography

1. Background: National Patterns and Trends

Positron Emission Tomography (PET) is an advanced form of nuclear medicine. Nuclear medicine refers generally to the use of radioisotopes (e.g., radioactive isotopes of iodine, thallium) in medical diagnosis and treatment.

Nuclear medicine procedures involve the injection or ingestion of radionuclides prepared for administration as a radiopharmaceutical. Special cameras and computers are used to generate images from the energy waves (gamma rays, beta rays, photons) released by the radioisotopes. The energy waves are detected by receptors as the radioactive material passes through or is localized (variably taken up) in body organs or systems.

One of the newer variants of nuclear medicine, positron emission tomography (PET), became available in the 1970's. Originally used in cardiology, primarily as a tool for imaging the heart to detect damaged areas of the myocardium and to determine the viability of cardiac tissue, the principal use of PET today is in oncology and neurology. The advance of PET from cardiac perfusion studies into cancer-related imaging and treatment began in the early 1990s when whole-body scanners with adequate resolution and improved software for image acquisition, processing, and display became available.

PET technology is a metabolically based imaging modality that complements, rather than substitutes for, other imaging and diagnostic technologies. Nearly all current imaging technologies such as x-ray, CT, and MRI provide images of anatomical features. PET is unique in that it allows assessment of chemical and physiological changes related to metabolism. Because functional changes often precede structural changes in tissues, PET images may reveal pathological conditions before other imaging modalities, e.g., CT and MRI, are capable of detecting them. This makes earlier diagnosis and treatment possible.

Unlike traditional nuclear medicine, PET uses unique radiopharmaceuticals or tracers, labeled with isotopes such as carbon, oxygen, nitrogen, and fluorine, which are among the basic elements of biological matter. These isotopes mimic natural substances found in the body such as water, sugars and oxygen. Consequently, PET reveals more about the cellular level metabolic status of a disease than other imaging modalities. PET imaging can provide diagnostic information that may alter patient management, change the course of treatment, eliminate the need for multiple diagnostic tests, eliminate the need for surgical intervention, and in some cases reduce the total cost of patient care.

PET is now recognized as a valuable tool in the diagnosis, staging, and treatment planning of patients with solitary pulmonary nodules, carcinoma of the lung (non-small cell), melanoma, colorectal cancer, lymphoma, head and neck tumors, esophageal cancer, breast cancer, refractory seizures, perfusion of the heart, as well as the earlier applications in assessing myocardial viability. The recent pairing of CT scanning with PET expands substantially diagnostic imaging capabilities.

The growing list of PET procedures approved for Medicare reimbursement reflects PET's increasing significance. To date, the combination of PET with CT has not resulted in major changes in the reimbursement rates of major insurers. The original PET scanners introduced over the last 5 to 7 years are being replaced with PET-CT scanners which are technically advanced, have wider clinical applicability, and have substantially greater system efficiency and throughput. PET-CT scanner capacity and throughput are such that few are, or can be, used efficiently. Where there is sufficient demand, PET-CT scans may be scheduled at three per hour (20 minutes per scan). Depending on hours of operation, the nominal capacity of a PET-CT scanner is between 6,000 and 8,000 scans per year. Most scanners now in service are used at substantially less than 20% of capacity. In this regard, the effective capacity of nearly all mobile PET-CT services is a function of the number of sites served and the efficiency of the service route(s) used, not the number of scans performed.

Compared with CT and MRI imaging, current indications for PET scans are limited. Ongoing research indicates that the demand for PET services is likely to increase steadily, however, for a number of years. New uses of PET continue to be documented, especially in the early detection of disease and treatment planning. Anticipated additional applications for PET technology include use in neurology and psychiatry, especially in the diagnosis of Parkinson's disease and the early detection of Alzheimer's disease.

There is only limited data available nationally to describe demand and use levels. Where PET-CT services are widely available, recent gross use rates have been between 2.0 and 3.0 scans per 1,000 persons. The large majority of these procedures are for the treatment planning and staging of cancer patients. The large majority of PET-CT service sites are at locations with cancer treatment services. Where both services are available, recent experience indicates that about 40% of radiation therapy patients may received PET-CT scans and that, on average, these patients are likely to have between 2 and 3 PET-CT scans during the course of treatment.

2. Mississippi Experience

As with CT and MRI scanning, the diffusion of PET technology in Mississippi appears to have followed the national pattern. There are now nearly 30 authorized PET service sites in the state. There are six fulltime fixed site services. The large majority are at community hospitals where the service is provided by a mobile vendor. About 7,350 PET scans were provided statewide in 2005.

It is evident the Mississippi has more than adequate PET-CT capacity. To date, the highest program service volume reported is the 1,200 scans at North Mississippi Medical Center (Tupelo). There are four fulltime fixed site scanners in Jackson. Their volumes range from about 350 to 1,100 scans per year. The most recent data suggest that the current Mississippi PET use rate is about 2.5 scans per 1,000 persons.

There is as yet no identified relationship between specific disease conditions and PET scanner use that can be relied on for service planning purposes. Experience over the last

five years in communities where PET (and more recently PET-CT) services have been readily available, indicates that the crude use rates have been between 2.0 and 2.5 scans per 1,000 persons.

Current need determination and projection methods are based on policies that require a base service area population of 300,000 persons and a minimum service volume of 750 scans per scanner per year. Given current and expected near term (next 5 years) use levels, these standards are low. Given the inherent limited demand for PET-CT services, and the capacity and operating efficiency of state-of-the-art PET-CT technology, average service volumes will be low for sometime if the service is to be generally available statewide.

In the aggregate, the current statewide level of demand is well within the capacity of two PET-CT systems. Where demand is sufficient, PET-CT systems readily provide in excess of 5,000 procedures per year. Under optimal circumstances, capacity of state-of-the-art systems is between 6,000 and 8,000 scans per year.

As is the case nationwide, a substantial majority of current and expected future demand for PET imaging is the diagnosis, staging, and treatment planning for cancer patients. Cancer incidence and mortality in Mississippi are comparatively high. This factor is already reflected in the development and use of PET-CT services in the state. The current distribution of PET-CT services appears reasonable, given the constraints and complexities involved in the delivery of PET services. There is no indication that additional capacity will be needed for several years.

Use data are not available to track intrastate PET-CT use levels and patterns, or to project future demand in Mississippi. A statewide diagnostic imaging data collection program is needed to support planning and service development initiatives. These data will be needed to assess the need and viability of potential new PET-CT services.

Beyond data limitations, the principal problem encountered in developing a reliable planning methodology for PET services is that imaging technologies, and the clinical application and utility of them, are dynamic and have been changing rapidly for several years. This is expected to continue. Use rates and aggregate demand will continue to grow. The uncertainty is how quickly and how long.

3. Conclusions and Findings

PET services are widely available in Mississippi. Recent service use levels and rates are comparable to those seen nationally and in peer states. The clinical value of PET-CT technology is expected to grow for several years. PET services are available in all regions of the state. There is no evidence that CON regulation has limited access to PET-CT services.

As in most states, there is substantial unused PET-CT capacity in Mississippi. This appears to result from a desire to balance (or favor) access to the technology with

operating efficiency. There is no indication that additional capacity will be needed over the useful life of the scanners now in use. Current service volume planning standards are low relative to PET-CT scanner capacity and operating efficiency (throughput).

4. Recommendations

Minimum Service Volume: Given the technological advances in PET-CT scanning, the capacity and throughput of PET-CT scanners, the limited demand for PET services, and the small number of procedures per patient over a course of radiation therapy, the minimum service volume planning standard should be increased from 750 scans to 1,500 scans per scanner per year. The service area population considered necessary to support a PET-CT service should be increased to 500,000 persons.

G. Computed Tomography

1. Background: National Patterns and Trends

Computed tomography (CT) scanning has proven its value as a diagnostic and treatment-planning tool in a wide array of clinical applications and in a number of medical disciplines. It is the standard of medical practice in a number of clinical settings. The number of clinical applications in which CT scanning is essential, and in which it is used in conjunction with and complementary to other advanced diagnostic and treatment technologies, continues to grow. CT scanning is considered to be necessary and appropriate for community hospital emergency departments.

Scanners are expensive and have relatively high operating costs. Initial capital outlays of one to two million dollars are common, particularly for high-speed helical scanners. Procedure costs range from several hundred to more than a thousand dollars. Although the costs are high, the information obtained from CT scanning is often useful in diagnosis and treatment planning, may not be obtainable otherwise, and may be partially offset by reductions in the number of other procedures ordered and, in some cases, the cost of hospitalization. Excluding physician charges, most of the costs incurred in the acquisition and operation of scanners are fixed costs, or costs that are fixed within a broad range of use, i.e., they do not change unless use levels change greatly. Consequently, unnecessary scanners and inefficiently used scanners can increase total costs substantially.

Experience with the development and use of diagnostic imaging services in a number of states over the last two decades illustrates the challenge and promise of planning for these services. The history of CT scanning can usefully be viewed in three time periods. The first is from the late 1970s, when the first CT scanners were placed in community service, through the 1980s. During the 1980s, CT scanners were added gradually, as experience and clinical applications grew. The clinical application of, and demand for, CT scanning grew steadily during this period, shifting gradually from predominately head and neck scanning to full-body scanning as the technology advanced and clinical experience accumulated. The principal planning goal during this period was to try to calibrate the diffusion of the new technology, to ensure that it was located where it was needed most and would be used most efficiently. These locations were largely community hospitals, initially those with the large caseloads and broad service areas.

The second distinctive period was between 1987 and 1999. By 1987 the planning environment became more permissive. During this period a number of states dropped CON regulation of CT scanning. This environment invited speculation and the development of marginal service programs. The numbers of CT scanners quickly doubled and in many areas doubled again. Soon, supply greatly exceeded demand. Operating efficiency declined, and total and capital unit costs increased. The principal planning objectives and tasks during this period were to compensate to the extent possible for the skewed service development pattern and the rapid buildup of surplus capacity. In many communities, it took several years to absorb and use effectively these surpluses.

Unusually rapid growth in imaging demand began in the late 1990s. Demand has more than doubled since 1999. Improvements in technology have produced high-speed helical scanners with better multidimensional images and much faster scan times. This has permitted broader clinical application of CT imaging and has substantially increased operating efficiency. Average scan times have decreased significantly. CT scanner efficiency and throughput has increased more than threefold over the last decade. Recognizing broader clinical applications, the technological changes underway, the extraordinary growth in demand, and the economic and system shaping implications of this growth, the principal planning tasks now is to calibrate supply and demand and promote system stability and equity. Capacity has been permitted to grow to accommodate demand. The appropriate balance between hospital-based imaging services and freestanding centers has emerged as a major planning concern.

With rapid technological advances the cost of state-of-the-art CT scanners has increasing significantly in recent years. These cost increases and accelerating demand has caused some states to revisit the question of CON regulation of CT scanning. West Virginia, for example, recently reinstated regulation after several years of deregulation.

2. Mississippi Experience

As with other advanced diagnostic imaging technologies, the diffusion and use of CT scanners in Mississippi appears to have followed the national pattern. Over the two decades between 1980 and 2000, the ratio of hospital-based CT scanners per 1,000 persons in Mississippi increased at a rate of more than 8% annually compared with a national rate of increase of about 4.5%. Indexed to the national norm, the Mississippi complement of CT scanners grew from 101% of the national level in 1980 to 197% of the national level in 2000.[66]Reliable historical use data are not available, but it appears that per capita use of CT scanners in Mississippi has been higher than the national norm for a number of years.

CT scanning is not now subject to CON review in Mississippi. Coverage was dropped a number of years ago at a time when the cost of many CT scanners was falling below the medical equipment capital expenditure review threshold, computed tomography was becoming a routine clinical service, and a number of other states were eliminating regulation of the service.

In the last few years, however, some state-of-the-art CT scanners require CON review because they are above the $1.5 million medical capital expenditure review threshold. Advanced high-speed CT scanners now have capital costs comparable to those of MRI and PET scanners: $2,000,000 to $3,000,000. Some states that eliminated regulation of CT capital expenditures are considering reinstating coverage. After removing CT scanning and other major medical equipment from CON regulation in 1989, Virginia resumed regulation of all of these services and equipment in the 1990s. West Virginia recently reinstated CON regulation of CT scanners because of the higher costs and expanding use.

Although the number of CT scans performed is greater than MRI or PET scans, the economic and service delivery issues regarding CT scanners are otherwise similar to those affecting MRI and PET scanning. It would be reasonable, therefore, to consider reinstating CON coverage of CT services on the same basis that MRI and PET services are subject to review. If the $1.5 million medical equipment capital expenditure review threshold were to be replaced by coverage of any new service or expansion for covered services, including CT scanning as a covered service would be advisable.

3. Conclusions and Findings

CT scanning continues to be an expensive rapidly growing diagnostic technology. Capital costs of state-of-the-art CT scanners have increased significantly in recent years. As with MRI scanning, the revenue and operating margins from CT scanning are increasingly important considerations in assuring the economic stability and viability of essential community hospitals.

CT scanning capacity and use in Mississippi appear to exceed national levels. Based on experience of the last two decades, there is no evidence that CON regulation limited inappropriately access to CT services when they were subject to regulation.

4. Recommendation

***Regulation of CT Services*:** Establishment and expansion of CT scanning services should be subject to CON regulation. Coverage should be modeled after that applied to MRI services. Replacement of existing CT scanners should remain exempt from CON review.

Medical Equipment Capital Expenditure Threshold: The permutations associated with the current medical equipment capital expenditure review threshold creates disincentives for efficient and effective program operations, permits "gaming" of the review process, and does not treat all service providers fairly.

Consideration should be given to eliminating the medical equipment capital expenditure review threshold, exempting all equipment replacement projects from review, and requiring the review of all new services and all expansions (equipment additions) of covered services. This pattern of coverage would be more easily understood and administered, would establish a "level playing field," and would be more equitable to all affected parties.

[1] Based on AHPA's monitoring of planning and CON activities nationwide. The most recent AHPA survey was completed in March 2007.

[2] Murtaugh, CM, Kemper, P, and Spillman, BC, "The Risk of Nursing Home Use In Later Life." *Medical Care* 28(10): 952-962, 1990.

[3] American Health Care Association: *The Nursing Facility Sourcebook, 1998*. Executive Summary, p. 1.

[4] AHCA, *The Nursing Facility Sourcebook*, 1998; AHCA, *The State of Long Term Care Sector, 2004;Characteristics, Utilization and Government Funding*, March 2005; CMS OSCAR, Form 672, 2006.

[5] Rhoades, JA, Krauss NA. Nursing Home Trends, 1987 and 1996. Rockville (MD): AHCPR; 1999, *MEPS Chartbook* No. 3, p. 18.

[6] See longitudinal Virginia nursing home patient origin data for the period 1985 – 2006.

[7] *Ibid.*, p. 14.

[8] Harrington, C., Curtis, M., and DuNah, R., "Trends in State Regulation of the Supply of Long term Care Services," Health Care Financing Administration, San Francisco, 1994.

[9] Swan, J., Dewit, S., et. al.: "Trends in State Medicaid Reimbursement for Nursing Homes," *Health Care Financing Administration*, Wichita University, 1993.

[10] DuNah, R., Harrington, C., Bedney, B., Carillo, H. "Variations and Trends in State Nursing Facility Capacity: 1987-93," *Health Care Financing Review* (Fall, 1995): Vol. 17, No. 1, p. 184.

[11] *Ibid*.

[12] This is possible, but not a convincing explanation in that most states with bed ratios well below the mean also had decreases (i.e., moved away from the mean).

[13] Harrington, C., Curtis, M., and DuNah, R., "Trends in State Regulation of the Supply of Long term Care Services," Health Care Financing Administration, San Francisco, 1994, p. 196.

[14] See *South Carolina State Health Plan*, October 2004, pp. 113-117 and *Alabama State Health Plan, 2004-2007*, 2004, pp. 81-82.

[15] American Health Planning Association, *Health Services Planning and Certificate of Need Regulation in Mississippi*, October 2006, pp. 40-42.

[16] *The New Economics of Care: Briefing for the Board and Health System Executives,* The Advisory Board Company, 2000, pp. 38-39.

[17] *Hospital of the Future: Lessons for Inpatient Facility Planning and Strategy*, The Advisory Board Company, 2007, p. 2.

[18] *Mississippi State Health Plan*, Chapter 11, pp. 1-4.

[19] This discussion omits consideration of the time of day the average daily census is taken. Many argue that the midnight census count underestimates considerably actual bed need during the day because it does not account for those occupying holding and/or observation beds who are either never admitted or may discharged before the midnight census is taken. Given the large surplus, this consideration is of limited applicability statewide.

[20] Maryland Hospital Bed Formula, COMAR 10/10.07.01.06-1.06-1.

[21] The term PCI as used here subsumes percutaneous transluminal coronary angioplasty (PTCA).

[22] As used here diagnostic cardiac catheterization procedures include those properly described by the following ICD-9-CM codes: 37.21 (Right Heart Cardiac Catheterization); 37.22 (Left Heart Cardiac Catheterization); 37.23 (Combined Right and Left Heart Cardiac Catheterization). Therapeutic catheterizations ICD-9-CM codes are: 35.96 (Percutaneous Valvuloplasty); 36.01 (Atherectomy, Coronary, PTCA, Single Vessel); 36.02 (Atherectomy, Coronary, PTCA, Single Vessel, with Thrombolytic Agent); 36.05 (Atherectomy, Coronary, PTCA, Multiple Vessel); 36.06 (Insertion of Coronary Stent); 36.07 (Insertion of Drug Eluting Coronary Stent).

[23] This pattern could change, perhaps significantly, as a result of recently released medical research calling into the question the value of coronary angioplasty and the use of stents (regular and drug eluting) in treating coronary artery disease. The logical implications of these studies would be increased reliance on medical treatment and management of coronary artery disease and correspondingly fewer PCI procedures. It will take some time (perhaps several years) to determine the magnitude of change in medical practice, if any, the studies will produce. These studies, and a number of related reports calling into question current

practices, do suggest that caution is in order in planning for interventional cardiovascular services. For study details see W. E. Boden, M.D., *et. al.*, "Optimal Medical Therapy with or without PCI for Stable Coronary Disease," *The New England Journal of Medicine*, March 27, 2007: 356, and J. Boden, MD, *et. al.*, "Coronary Intervention for Persistent Occlusion after Myocardial Infarction," *The New England Journal of Medicine*, December 7, 2006: 355, 2395-407.

[24] American Heart Association, *Heart Disease and Stroke Statistics — 2007 Update*. Dallas, Texas: American Heart Association, 2007.

[25] *Ibid*. See trends data.

[26] Appropriateness Criteria for Cardiac Computed Tomography and Cardiac Magnetic Resonance Imaging: A Report of the American College of Cardiology Foundation Quality Strategic Directions Committee Appropriateness Criteria Working Group, American College of Radiology, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, American Society of Nuclear Cardiology, North American Society for Cardiac Imaging, Society for Cardiovascular Angiography and Interventions, and Society of Interventional Radiology**.** *Journal of the American College of Cardiology, 2006: 48;1475-1497.*

[27] W. E. Boden, M.D., *et. al.*, "Optimal Medical Therapy with or without PCI for Stable Coronary Disease," *The New England Journal of Medicine*, March 27, 2007: 356

[28] Katritsis DG, Ioannidis JP. "Percutaneous Coronary Intervention Versus Conservative Therapy in Nonacute Coronary Artery Disease: a Meta-analysis," *Circulation,* 2005: 111:2906-12.

[29] W. E. Boden, M.D., *et. al.*, "Optimal Medical Therapy with or without PCI for Stable Coronary Disease," *The New England Journal of Medicine*, March 27, 2007;356

[30] There is unchallenged evidence that timely, wider application of PCI treatment is beneficial in the treatment of STEMI (ST-elevated myocardial infarction) heart attack patients. See Topol EJ. "Current Status and Future Prospects for Acute Myocardial Infarction Therapy." *Circulation,* 108 (III): 6-13, 2003; and McKay RG. "Evolving Strategies in the Treatment of Acute Myocardial Infarction in the Community Hospital Setting." *Journal of the American College of Cardiology*, 42:642-45, 2003.

[31] The assertion by some that fewer and fewer states require surgical support for PCI may be technically correct, but can be misleading. Their statements usually are predicated on interpreting, as a fundamental shift in regulatory policy that is "deregulatory" in nature, the implementation of demonstration projects and waiver programs to permit selected hospitals to offer PCI without onsite surgical support. That usually is not the case. The impetus for such initiatives in almost all cases is to improve the planning and regulatory process by ensuring that they recognize and incorporate evolving technology, changing professional standards, and best practices based on research and evidence. Successful implementation of these initiatives, while safeguarding the public interest, is demanding. It requires better data systems, better planning, and better integration of data collection, analysis, planning and regulation.

[32]For example see Aversano T, Passamani E, Knatterud GL, Terrin ML, Williams DO, Forman SA. "Thrombolytic Therapy vs Primary Percutaneous Coronary Intervention for Myocardial Infarction in Patients Presenting to Hospitals Without On-site Cardiac Surgery," *Journal of the American Medical Association,* 287:1943-51, 2002; Wharton TP, McNamara NS, Fedele FA, Jacobs MI, Gladstone AR, Funk EJ. "Primary Angioplasty for the Treatment of Acute Myocardial Infarction: Experience at Two Community Hospitals Without Cardiac Surgery," *Journal of the American College of Cardiology,* 33:1257-65, 1999; Hasdai D, Berger PB, Bell MR, Rihal CS, Garratt KN, Holmes DR. "The Changing Face of Coronary Interventional Practice: The Mayo Clinic Experience," *Archives in Internal Medicine,* 157:677-82, 1997; Jacobs AK. "Primary Angioplasty for Acute Myocardial Infarction—Is It Worth the Wait?" *New England Journal of Medicine,* 349:798-800, 2003.

[33] Most states with waiver programs distinguish carefully between ***primary*** and ***elective*** PCI. Typically, they have state data collection systems that permit therapeutic cardiac catheterization programs to be monitored more closely than elsewhere.

[34] All four have been under pressure for some time, in some cases several years, to eliminate the requirement that there be onsite surgical backup for PCI procedures. Three of the four, Connecticut, New Hampshire and Rhode Island, are focusing on the question of establishing a waiver program for primary PCI only. Washington is examining the advantages and disadvantages of waiver programs for both primary and elective PCI. It is unclear when these questions will be resolved. It seems likely, however, that waiver programs similar to those in New York, Maryland, and Massachusetts may be adopted.

[35] The American College of Cardiology maintains several cardiovascular services registries, including the National Cardiovascular Data Registry (NCDR™).
[36] Sidney Smith, MD, *et. al.*, ACC/AHA/SCAI 2005 Guideline Update for Percutaneous Coronary Intervention: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/SCAI Writing Committee to Update the 2001 Guidelines for Percutaneous Coronary Intervention, *Circulation*, January 3, 2006, p. 4.
[37] *Ibid p.9.*
[38] Sidney Smith, MD, *et. al.*, *ACC/AHA/SCAI 2005 Guideline Update for Percutaneous Coronary Intervention: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/SCAI Writing Committee to Update the 2001 Guidelines for Percutaneous Coronary Intervention, Circulation*, January 3, 2006, p. 3.
[39] Ibid.
[40] See "SCAI Expert Panel Sets High Standards for PCI Without On-Site Cardiac Surgical Back-up," Society for Cardiovascular Angiography and Interventions, February 5, 2007: www.scai.org/pr.aspx?page_ID=5025.
[41] *Ibid*.
[42] *Ibid*.
[43] AHPA tabulations of MDH hospital data from annual hospital licensure reports.
[44] J. Sunshine, R. Lewis, M. Bhargavan, "A Portrait of Interventional Radiologists in the United States," *American Journal of Roentgenology, 185:1103-1112.*
[45] Optimal Resources for the Examination and Endovascular Treatment of the Peripheral and Visceral Vascular Systems: AHA Intercouncil Report on Peripheral and Visceral Angiographic and Interventional Laboratories. J Cardella, W Casarella, J DeWeese, G Dorros, J Gray, B Katzen, J Laragh, D Levin,V Marx, E Nickoloff, M Pentecost, G Roubin, E Martin (Task Force Chair), *Journal of Vascular and Interventional Radiology*, 2003; 14:S517–S530. See Appendix A for a list of cardiac catheterization, interventional radiology, and neuroradiology guidelines and standards.
[46] "Stent-Graft Repair for Abdominal Aneurysm," *Interventional Radiology Grand Rounds*. The Society of Interventional Radiology, 2004.
[47]Health Care Advisory Board, *Future of Vascular Services: Strategic Forecast and Investment Blueprint*, 2004.
[48] *Future of Vascular Services: Strategic Forecast and Investment Blueprint*, The Advisory Board, 2005, p. 58.
[49] Higashida, R, et. al., Reporting Standards for Carotid Artery Angioplasty and Stent Placement. *Stroke*. 2004: 35:112-133.
[50]*Future of Vascular Services: Strategic Forecast and Investment Blueprint.* Health Care Advisory Board, 2004.
[51] "Carotid Angioplasty and Stenting: Implications of Developments in Research and Reimbursement," *Emerging Trends and Technologies Report*. Trinity Health, March 2005.
[52]Barr, J, et al. Quality Improvement Guidelines for the Performance of Cervical Carotid Angioplasty and Stent Placement, *Journal of Vascular Interventional Radiology*, 2003: 14:1079-1093; Connors, J, et al. Training, Competency, and Credentialing Standards for Diagnostic Cervicocerebral Angiography, Carotid Stenting, and Cerebrovascular Intervention, *American Journal of Neuroradiology*, November/December 2004: 25:1732-1741.
[53] *Ibid*.
[54] Optimal Resources for the Examination and Endovascular Treatment of the Peripheral and Visceral Vascular Systems: AHA Intercouncil Report on Peripheral and Visceral Angiographic and Interventional Laboratories. J Cardella, W Casarella, J DeWeese, G Dorros, J Gray, B Katzen, J Laragh, D Levin,V Marx, E Nickoloff, M Pentecost, G Roubin, E Martin (Task Force Chair), *Journal of Vascular and Interventional Radiology*, 2003; 14:S517–S530. See Appendix A for a list of cardiac catheterization, interventional radiology, and neuroradiology guidelines and standards. Copies of the documents listed in Appendix A have been provided separately (January 30, 2007) in printed and electronic form.
[55] *Ibid,* p.17.
[56] The American College of Radiology estimates that there are approximately 5,000 qualified interventional radiologists and about 300 qualified neuroradiologists in the U. S.

[57] "Minimally invasive surgery and image-guided surgical techniques are highlighting the need for radical physical intervention in health care facility design." Rostenberg, Bill, 'Surgology' is Coming! Designing for the Convergence of Surgery and Interventional Radiology, *Health Facilities Management*, Vol. 18(6) June 2005, pp. 49-52. See also Bill Rostenberg, *Architecture of Medical Imaging: Designing Healthcare Facilities for Advanced Radiological Diagnostic and Therapeutic Techniques*, Wiley Publishing, June 2006.

[58] *Ibid*. A related development worthy of consideration is that an important factor in interventional radiology laboratories being used more heavily for surgical-like therapeutic procedures is the movement of large percentages of the diagnostic caseload from these laboratories to less costly advanced diagnostic imaging rooms, e.g., high-speed computed tomography angiography (CTA) and magnetic resonance angiography (MRA). As a result, many surgical procedures heretofore performed only in operating rooms are now routinely performed in advanced procedure rooms, and many of the diagnostic procedures commonly performed in interventional procedure rooms are now being performed in the outpatient diagnostic imaging environment.

[59] One such system is marketed under the trademark name TomoTherapy.™

[60] More information on the radiation therapy technologies is available online at the following web sites: http://www.accuray.com/cyberknife.htm - http://www.elekta.com/ - http://www.varian.com/

[61] *Mississippi Burden of Cancer Report: Statistic`s for Cancer Disease in Mississippi*, 2005, p. 33.

[62] See, for example, "Impact of Limited-service Providers on Communities and Full-service Hospitals," *AHA Trend Watch*, Vol. 6, No. 2, September 2004.

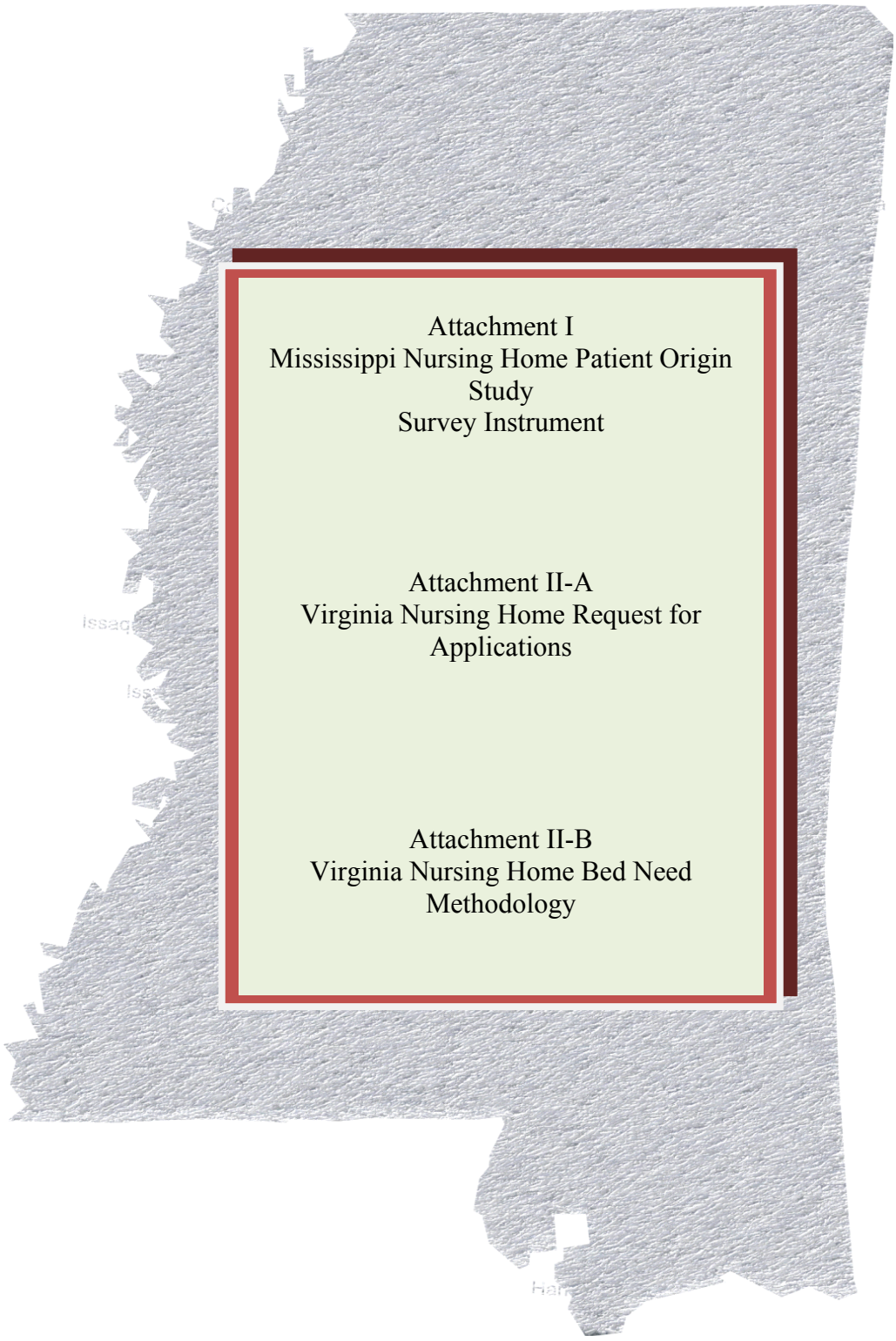
[63] *Ibid*.

[64] Mississippi's smaller than average population and the increase of MRI scanner numbers from a small base are minor factors in the variance between the national and Mississippi ratios. They do not explain the majority of the difference.

[65] Historical data in C. Conover and F. Sloan, *Evaluation of Certificate of Need in Michigan*, Volume II, Tables E-3A and E-43, 2005.

[66] Historical AHA data summarized in C. Conover and F. Sloan, *Evaluation of Certificate of Need in Michigan*, Volume II, Tables D-4A and D-4B, 2005.

Appendix A



Attachment I
Mississippi Nursing Home Patient Origin Study
Survey Instrument

Attachment II-A
Virginia Nursing Home Request for Applications

Attachment II-B
Virginia Nursing Home Bed Need Methodology

Attachment I
Mississippi Nursing Home Patient Origin Study
Survey Instrument

Current Residents

Mississippi Nursing Home & Nursing Facility Patient Origin Survey - 2008

Please type in Facility ID from Paper form

Part A: Facility Information

Facility Name:

Address:

City: Zipcode: State:

Person Completing Survey:

Title: Phone# :

Total Number of Residents on Survey Date:

Please complete this survey and return it by June 30, 2008

Send to:
Office of Health Policy and Planning

Mississippi Department of Health
570 Woodrow Wilson Boulevard
Jackson, MS 39210

A stamped envelope is enclosed for your convenience.

If you have any questions regarding this survey, contact Brad Wellons at (601) 576-7877

Remember to use the ID number assigned by MDH. It can be found on the paper form.

Part B: Resident Information

Please list all residents in this facility as of 12:01 a.m. on Wednesday, June 25, 2008.
Include all requested information for each resident.
Residents in Assisted Living Units are NOT included in the survey.

Facility ID Number	Last Four Digits of Resident's Social Security Number	Resident's Initials	Home Address of Patient Prior to Admission *(For If Continuing Care [CC] contract patient, report home address prior to contract)*				Type of Care	Time of Admission		Principal Source of Payment	Source of Admission	Year of Birth	Sex	Race	Marital Status
			CC	City or County	State	Zipcode		Month	Year						
(Assigned by MDH, Located on first page of paper form)		(Please provide 3 initials)	Mark with * if CC	(e.g., Rankin, Jackson,)	(e.g., MS)	(e.g., 39210)	S=SNF N=NF U=Non-certified	Please Use Numeric Designation (e.g., Jan=1,Feb=2)	Please Use Full Year (e.g., 2003)	M=Medicaid X=Medicare S=Self Pay V=Vet.Admin. I=Private Insur. C=Covered by CC O=Other	R= Private Residence A=Adult Care Res. N=Other Nursing Home H= Gen.Hospital P=Psych.Hosp. V=VA Hospital O=Other	Please Use Full Year (e.g.,1897, 1925)	M=Male F=Female	W=White B=Afican Amer/Black N=Native Amer. A=Asian/Pac.Island. H=Hispanic	M=Married W=Widow or Widower D=Divorced or Separated S=Single
Sample Record															
3001	2321	PMB		Jackson	MS	39210	U	3	2001	I	R	1933	M	W	D
Start Your Residents' Records On the Line Below															

Facility ID Number	Last Four Digits of Resident's Social Security Number	Resident's Initials	Home Address of Patient Prior to Admission *(For If Continuing Care [CC] contract patient, report home address prior to contract)*				Type of Care	Time of Admission		Principal Source of Payment	Source of Admission	Year of Birth	Sex	Race	Marital Status
			CC	City or County	State	Zipcode		Month	Year						
(Assigned by MDH, Located on first page of paper form)		(Please provide 3 initials)	Mark with * if CC	(e.g., Rankin, Jackson,)	(e.g., MS)	(e.g., 39210)	S=SNF N=NF U=Non-certified	Please Use Numeric Designation (e.g., Jan=1.Feb=2)	Please Use Full Year (e.g., 2003)	M=Medicaid X=Medicare S=Self Pay V=Vet.Admin. I=Private Insur. C=Covered by CC O=Other	R= Private Residence A=Adult Care Res. N=Other Nursing Home H= Gen.Hospital P=Psych.Hosp. V=VA Hospital O=Other	Please Use Full Year (e.g.,1897, 1925)	M=Male F=Female	W=White B=Afican Amer/Black N=Native Amer. A=Asian/Pac.Island. H=Hispanic	M=Married W=Widow or Widower D=Divorced or Separated S=Single

Attachment II-A

Nursing Home Request For Applications (RFAs)
Virginia Department of Health Program
Code of Virginia § 32.1-102.3:2.

A. Except for applications for continuing care retirement community nursing home bed projects filed by continuing care providers registered with the State Corporation Commission pursuant to Chapter 49 (§ 38.2-4900 et seq.) of Title 38.2 which comply with the requirements established in this section, the Commissioner of Health shall only approve, authorize or accept applications for the issuance of any certificate of public need pursuant to this article for any project which would result in an increase in the number of beds in a planning district in which nursing facility or extended care services are provided when such applications are filed in response to Requests For Applications (RFAs).

B. The Board of Health shall adopt regulations establishing standards for the approval and issuance of Requests for Applications by the Commissioner of Health. The standards shall include, but shall not be limited to, a requirement that determinations of need take into account any limitations on access to existing nursing home beds in the planning districts. The RFAs, which shall be published at least annually, shall be jointly developed by the Department of Health and the Department of Medical Assistance Services and based on analyses of the need, or lack thereof, for increases in the nursing home bed supply in each of the Commonwealth's planning districts in accordance with standards adopted by the Board of Health by regulation. The Commissioner shall only accept for review applications in response to such RFAs which conform with the geographic and bed need determinations of the specific RFA.

C. Sixty days prior to the Commissioner's approval and issuance of any Request For Applications, the Board of Health shall publish the proposed RFA in the Virginia Register for public comment together with an explanation of (i) the regulatory basis for the planning district bed needs set forth in the RFA and (ii) the rationale for the RFA's planning district designations. Any person objecting to the contents of the proposed RFA may notify, within fourteen days of the publication, the Board and the Commissioner of his objection and the objection's regulatory basis. The Commissioner shall prepare, and deliver by registered mail, a written response to each such objection within two weeks of the date of receiving the objection. The objector may file a rebuttal to the Commissioner's response in writing within five days of receiving the Commissioner's response. If objections are received, the Board may, after considering the provisions of the RFA, any objections, the Commissioner's responses, and if filed, any written rebuttals of the Commissioner's responses, hold a public hearing to receive comments on the specific RFA. Prior to making a decision on the Request for Applications, the Commissioner shall consider any recommendations made by the Board.

D. Except for a continuing care retirement community applying for a certificate of public need pursuant to provisions of subsections A, B, and C above, applications for continuing care retirement community nursing home bed projects shall be accepted by the Commissioner of Health only if the following criteria are met: (i) the facility is registered with the State Corporation Commission as a continuing care provider pursuant to Chapter 49 (§ 38.2-4900 et seq.) of Title 38.2, (ii) the number of new nursing home beds requested in the initial application does not exceed the lesser of twenty percent of the continuing care retirement community's total number of beds that are not nursing home beds or sixty beds, (iii) the number of new nursing home beds requested in any subsequent application does not cause the continuing care retirement community's total number of nursing home beds to exceed twenty percent of its total number of beds that are not nursing home beds, and (iv) the continuing care retirement community has established a qualified resident assistance policy.

E. The Commissioner of Health may approve an initial certificate of public need for nursing home beds in a continuing care retirement community not to exceed the lesser of sixty beds or twenty percent of the total number of beds that are not nursing home beds which authorizes an initial one-time, three-year open admission period during which the continuing care retirement community may accept direct admissions into its nursing home beds. The Commissioner of Health may approve a certificate of public need for nursing home beds in a continuing care retirement community in addition to those nursing home beds requested for the initial one-time, three-year open admission period if (i) the number of new nursing home beds requested in any subsequent application does not cause the continuing care retirement community's total number of nursing home beds to exceed twenty percent of its total number of beds that are not nursing beds, (ii) the number of licensed nursing home beds within the continuing care retirement community does not and will not exceed twenty percent of the number of occupied beds that are not nursing beds, and (iii) no open-admission period is allowed for these nursing home beds. Upon the expiration of any initial one-time, three-year open admission period, a continuing care retirement community which has obtained a certificate of public need for a nursing facility project pursuant to subsection D may admit into its nursing home beds (i) a standard contract holder who has been a bona fide resident of the non-nursing home portion of the continuing care retirement community for at least thirty days, or (ii) a person who is a standard contract holder who has lived in the non-nursing home portion of the continuing care retirement community for less than thirty days but who requires nursing home care due to change in health status since admission to the continuing care retirement community, or (iii) a person who is a family member of a standard contract holder residing in a non-nursing home portion of the continuing care retirement community.

F. Any continuing care retirement community applicant for a certificate of public need to increase the number of nursing home beds shall authorize the State Corporation Commission to disclose such information to the Commissioner as may be in the State Corporation Commission's possession concerning such continuing care retirement community in order to allow the Commissioner of Health to enforce the provisions of this section. The State Corporation Commission shall provide the Commissioner with the requested information when so authorized.

G. For the purposes of this section:

"Family member" means spouse, mother, father, son, daughter, brother, sister, aunt, uncle or cousin by blood, marriage or adoption.

"One-time, three-year open admission period" means the three years after the initial licensure of nursing home beds during which the continuing care retirement community may take admissions directly into its nursing home beds without the signing of a standard contract. The facility or a related facility on the same campus shall not be granted any open admissions period for any subsequent application or authorization for nursing home beds.

"Qualified resident assistance policy" means a procedure, consistently followed by a facility, pursuant to which the facility endeavors to avoid requiring a resident to leave the facility because of inability to pay regular charges and which complies with the requirements of the Internal Revenue Service for maintenance of status as a tax exempt charitable organization under § 501 (c) (3) of the Internal Revenue Code. This policy shall be (i) generally made known to residents through the resident contract and (ii) supported by reasonable and consistent efforts to promote the availability of funds, either through a special fund, separate foundation or access to other available funds, to assist residents who are unable to pay regular charges in whole or in part.

This policy may (i) take into account the sound financial management of the facility, including existing reserves, and the reasonable requirements of lenders and (ii) include requirements that residents seeking such assistance provide all requested financial information and abide by reasonable conditions, including seeking to qualify for other assistance and restrictions on the transfer of assets to third parties. A qualified resident assistance policy shall not constitute the business of insurance as defined in Chapter 1 (§ 38.2-100 et seq.) of Title 38.2.

"Standard contract" means a contract requiring the same entrance fee, terms, and conditions as contracts executed with residents of the non-nursing home portion of the facility, if the entrance fee is no less than the amount defined in § 38.2-4900.

H. This section shall not be construed to prohibit or prevent a continuing care retirement community from discharging a resident (i) for breach of nonfinancial contract provisions, (ii) if medically appropriate care can no longer be provided to the resident, or (iii) if the resident is a danger to himself or others while in the facility.

I. The provisions of subsections D, E, and H of this section shall not affect any certificate of public need issued prior to July 1, 1998; however, any certificate of public need application for additional nursing home beds shall be subject to the provisions of this act.

(1989, c. 517; 1990, cc. 191, 478, 753, 845; 1991, c. 561; 1992, cc. 612, 682; 1993, cc. 347, 474, 540, 564, 704, 762, 957, 993; 1994, cc. 57, 680, 711, 726, 797; 1995, cc. 505, 632, 641, 695, 753; 1996, cc. 531, 849, 901; 1998, c. 794.)

§ 32.1-102.3:2.1. Repealed by Acts 1998, c. 794.

§ 32.1-102.3:2.2. Expired.

§§ 32.1-102.3:3. , 32.1-102.3:4. Repealed by Acts 1992, c. 612.

Attachment II-B

VIRGINIA DEPARTMENT OF HEALTH VIRGINIA MEDICAL CARE FACILITIES CERTIFICATE OF PUBLIC NEED STATE MEDICAL FACILITIES PLAN

12 VAC 5-360-40. Availability

A. Need for additional nursing home beds.

No planning district will be considered to have a need for additional nursing home facility beds unless: (i) the resulting number of licensed and approved bed need forecast for nursing home beds in that planning district (see subsection C of this section) exceeds the current inventory of non-federal licensed and authorized beds in that planning district; and (ii) the estimated average annual occupancy of all existing non-federal Medicaid-certified nursing facility beds in the planning district was at least 95% for the most recent three years for which bed utilization has been reported to the department.(The bed inventory and utilization of the Virginia Veterans Care Center will be excluded from consideration in the determination of nursing home facility bed need.)

No planning district will be considered to have a need for additional nursing home beds if there are uncompleted nursing facility beds authorized for the planning district that will be Medicaid-certified beds.

B. Expansion of existing nursing facilities.

Proposals for the expansion of existing nursing facilities should not be approved unless the facility has operated for at least three years and average annual occupancy of the facility's existing beds was at least 95% in the most recent year for which bed utilization has been reported to the department.

Exceptions to this standard will be considered for facilities that have operated at less than 95% average annual occupancy in the most recent year for which bed utilization has been reported to the department when the facility can demonstrate that it has a rehabilitative or other specialized care focus which results in a relatively short average length of stay and, consequently, cannot achieve an average annual occupancy rate of 95%.

Preference will be given in the review of competing applications to proposals which involve the expansion of free-standing nursing home facilities of 60 or fewer beds when such facilities can demonstrate substantial compliance with the standards of the State Medical Facilities Plan.

In a case where no competing applicant is a freestanding nursing home facility with 60 or fewer beds or where free-standing nursing homes of 60 or fewer and 61 to 90 beds are competing, preference will also be given in the review of competing applications to proposals.

In a case where no competing applicant is a freestanding nursing home facility with 60 or fewer beds or where free-standing nursing homes of 60 or fewer and 61 to 90 beds are competing, preference will also be given in the review of competing applications to proposals which involve the expansion of freestanding nursing home facilities of 90 or fewer beds when such facilities can demonstrate substantial compliance with the standards of the State Medical Facilities Plan.

C. Bed need forecasting method. The number of nursing home facility beds forecast to be needed in a given planning district will be computed as follows:

PDBN = (UR64 * PP64) + (UR69 * PP69) + (UR74 * PP74) + (UR79 * PP79) + (UR84 *PP84) + (UR85+ * PP85+)

Where:

PDBN = Planning district bed need

UR64 = The nursing home bed use rate of the population aged 0 to 64 in the planning district as determined in the most recent nursing home patient origin study authorized by the department.

PP64 = The population aged 0 to 64 projected for the planning district three years from the current year as most recently published by the Virginia Employment Commission.

UR69 = The nursing home bed use rate of the population aged 65 to 69 in the planning district as determined in the most recent nursing home patient origin study authorized by the department.

PP69 = The population aged 65 to 69 projected for the planning district three years from the current year as most recently published by the Virginia Employment Commission.

UR74 = The nursing home bed use rate of the population aged 70 to 74 in the planning district as determined in the most recent nursing home patient origin study authorized by the department.

PP74 = The population aged 70 to PP74 = The population aged 70 to 74 projected for the planning district three years from the current year as most recently published by the Virginia Employment Commission.

U R79 = The nursing home bed use rate of the population aged 75 to 79 in the planning district as determined in the most recent nursing home patient origin study authorized by the department.

PP79 = The population aged 75 to 79 projected for the planning district three years from the current year as most recently published by the Virginia Employment Commission.

UR84 = The nursing home bed use rate of the population aged 80 to 84 in the planning district as determined in the most recent nursing home patient origin study authorized by the department.

PP84 = The population aged 80 to 84 projected for the planning district three years from the current year as most recently published by the Virginia Employment Commission.

UR85+ = The nursing home bed use rate of the population aged 85 and older in the planning district as determined in the most recent nursing home patient origin study authorized by the department.

PP85+ = The population aged 85 and older projected for the planning district three years from the current year as most recently published by the Virginia Employment Commission

Planning District Bed Need (from above method)	Rounded Bed Need
1 - 29	0
30 - 44	30
45 - 84	60
85 –104	90
105 – 184	120
185+	240

except in the case of a planning district which has two or more nursing facilities, has had an average annual occupancy rate of nursing home facility beds in excess of 95% for the most recent three years for which bed utilization has been reported to the department, and has a forecasted bed need of 15 to 29 beds. In such a case, the bed need for this planning district will be rounded to 30.

D. Minimum size of new nursing home facilities.

No new freestanding nursing home facilities of less than 120 beds should be authorized. Consideration will be given to the authorization of new freestanding facilities with fewer than 120 nursing home facility beds when such facilities are proposed for development in a rural area and can be justified on the basis of a lack of local demand for a larger facility and a maldistribution of nursing home facility beds within the planning district.

E. Continuing Care Retirement Communities.

Proposals for the development of new nursing home facilities or the expansion of existing facilities by Continuing Care Retirements communities will be considered in accordance with the following standards:

1. The total number of new or additional beds plus any existing nursing home facility beds operated by the continuing care provider does not exceed 20% of the continuing care provider's total existing or planned independent living and adult care residence population;

2. The proposed beds are necessary to meet existing or reasonably anticipated obligations to provide care to present or prospective residents of the

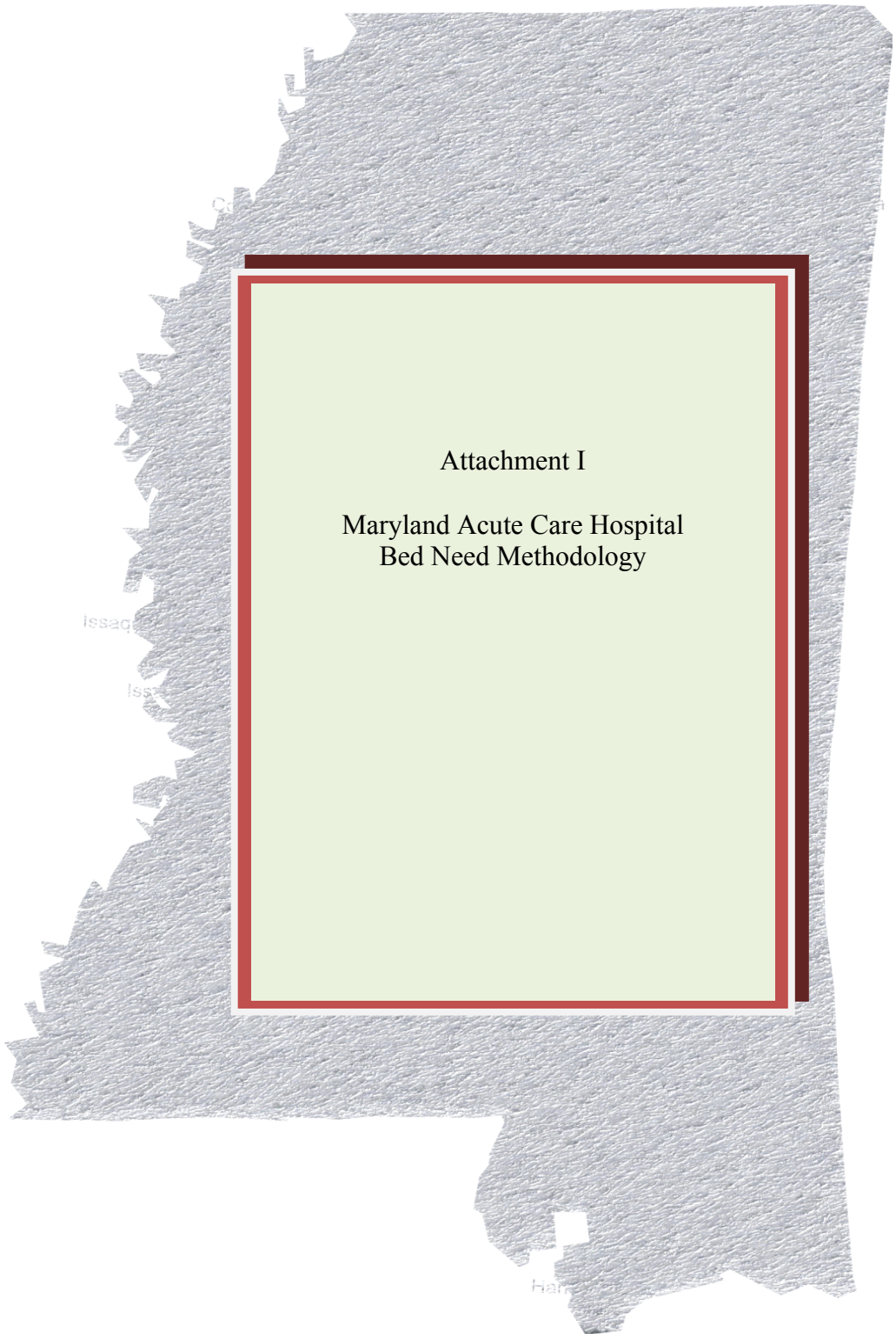
continuing care facility pursuant to continuing care contracts meeting the requirements of §38.2-4905 of the Code of Virginia;

3. The applicant agrees in writing not to seek certification for the use of such new or additional beds by persons eligible to receive medical assistance services pursuant to Title XIX of the United States Social Security Act;

4. The applicant agrees in writing to obtain, prior to admission of every resident of the Continuing Care Retirement Community, the resident's written acknowledgment that the provider does not serve recipients of medical assistance services and that, in the event such resident becomes a medical assistance services recipient who is eligible for nursing facility placement, such resident shall not be eligible for placement in the provider's nursing facility unit;

5. The applicant agrees in writing that only continuing care contract holders who have resided in the Continuing Care Retirement Community as independent living residents or adult care residents and are holders of standard continuing care contracts will be admitted to the nursing home facility beds after the first three years of operation.

Appendix B



Attachment I

Maryland Acute Care Hospital
Bed Need Methodology

Attachment I

Maryland Hospital Bed Formula
COMAR 10/10.07.01.06-1.06-1
Licensed Bed Capacity.

A. On or before July 1, 2000, and each July 1 thereafter, the Secretary shall determine the authorized licensed bed capacity for each hospital classified as a general hospital.

B. Methodology for Calculating Total Authorized Licensed Bed Capacity.

(1) The average daily census for each general hospital shall be obtained from the most current Health Services Cost Review Commission inpatient utilization data for a 12-month period.
(2) The calculation of average daily census shall include the utilization of inpatient medical-surgical, gynecology, obstetric, pediatric, and acute psychiatric service beds. Newborn services are excluded from the calculation of average daily census.
(3) The total licensed bed capacity for each general hospital shall equal 140 percent of the calculated average daily census for all inpatient acute care hospital services.

C. Application for Designation of Licensed Bed Capacity by Service.

(1) The Secretary shall annually forward to each general hospital its calculated total licensed bed capacity for the next licensure period and the current allocation of beds by major service category.
(2) In a format specified by the Secretary, each general hospital shall notify the Department of its designation of total beds by major service category for the next licensure period.
(3) The Maryland Health Care Commission shall review and approve the designation of total beds by major service category.
(4) This section does not permit a general hospital to reallocate bed capacity in a manner inconsistent with applicable statute and regulations.

D. On or before July 1, 2000, and each July 1 thereafter, the Secretary shall delicense any licensed hospital beds determined to be excess bed capacity under Regulation .07B of this chapter.

E. Temporary Adjustments to Calculated Licensed Bed Capacity.

(1) If necessary to adequately meet demand for services, a general hospital may exceed its calculated licensed bed capacity if:

(a) On average for the 12-month period, the hospital does not exceed its licensed bed capacity based on the annual calculation; and
(b) The hospital includes in its monthly report to the Health Services Cost Review Commission the following information:

(i) The number of days in the month the hospital exceeded its licensed bed capacity, and

(ii) The number of beds that were in excess on each of those days.

(2) A hospital exceeding its calculated licensed bed capacity shall notify the Department within 5 business days of the effective dates of the change in a format specified by the Secretary.

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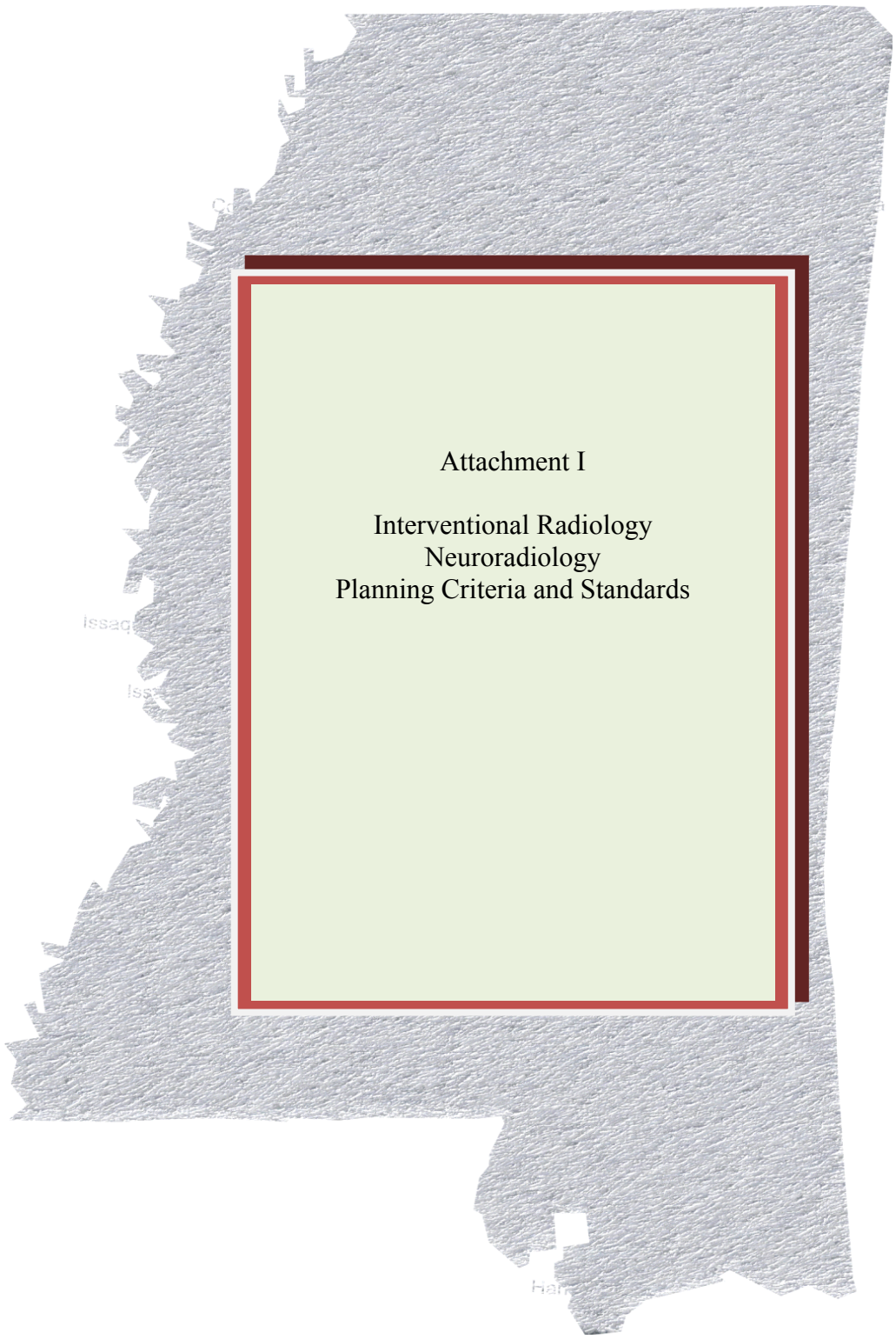
Appendix C



Attachment I

Interventional Radiology
Neuroradiology
Planning Criteria and Standards

Attachment I

Draft

Interventional Radiology Services
Neuroradiology Services

Review Standards

After determining whether an applicant has met the general review standards in Section I of this document, the department will apply the following service-specific review standards in its evaluation of an application for a certificate of need for interventional radiology services:

1. No new interventional radiology (or other specialty purpose interventional laboratory) may be approved in a community (or service area) with existing interventional services unless existing laboratories are operating at an average of at least 75% of capacity or an average of at least 750 procedures per year.

2. The applicant for a laboratory that proposes to offer a limited, defined set of special interventional procedures must demonstrate that at least 500 procedures per year will be performed.

3. All applicants must agree to meet fully the professional laboratory development and operation guidelines and standards, including operator quality assurance guidelines, that apply to the services (procedures) that are to be provided in the laboratory proposed. [Note: the Mississippi Department of Health will publish annually a list of the titles of professional guidelines and standards that apply and must be met by qualified applicants.]

4. All applicants must identify by diagnosis, procedure, and payment codes (ICD 9, CPT, DRG codes) the interventional procedures that are to be provided in the laboratory or facility proposed.

5. Preference will be given to proposals to develop inpatient interventional laboratories collocated with related interventional services and support services and facilities (e.g., CT, MRI, PET scanning, surgery suites, cardiac catheterization laboratories). The department may approve a laboratory that is not collocated with related and support services (e.g., CT, MRI, PET scanning, surgery suites, cardiac catheterization laboratories), or not attached to a hospital, where local circumstances prelude collocation,

6. An applicant who seeks to establish a new interventional laboratory in a community (or service area) without an existing service must demonstrates that the service is likely to perform a minimum of 500 procedures per year by the third year after initiation of the program.

7. The applicant agrees to submit annually to the Department data on the number and type of procedures provided in the proposed laboratory.

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Need Determination Steps

Several calculations are used to determine the demand for interventional services and the number of interventional laboratories required to meet projected demand efficiently.

The department will use the following formula to determine need for interventional radiology laboratories:

I. Standard Need Determination Method

►STEP ONE: Determine the projected interventional radiology (including neuroradiology) caseload (C) using the formula:

$$C = P \times UR$$

C (caseload) = the number of procedures in the third year following implementation of the project
P (projected population at risk) = the official state projection of the adult population (18 years of age and older) for the proposed service area (area and population to be served) in the third year following implementation of the project
UR (use rate) = the average annual number of interventional procedures for the preceding three years per 1,000 population for service area or special population to be served.

►STEP TWO: Determine the number of interventional radiology laboratories required (IRLR) using the formula:

$$IRLR = (C / LC) / TO$$

C (caseload) = number of interventional radiology procedures
LC (laboratory capacity) = defined as 1,000 procedures per year
TO (target minimum occupancy) = 75% (0.75)

►STEP THREE: Determine number of additional interventional radiology laboratories needed by subtracting the number of currently existing and CON-approved laboratories from the number found to be needed.

II. Alternative Need Determination Methods

Policy

The Department will consider, and use where appropriate, alternative methods to project future demand and service needs where local circumstances or other factors provide compelling evidence that the alternative method will produce more accurate or more reliable analytical results. Accordingly, the Department will evaluate alternative methods proposed by applicants. The Department will inform an applicant proposing an alternative planning method whether the method proposed may substituted for the prescribed method(s).